THE IRON AGE

A Review of the Hardware, Iron, Machinery and Metal Trades.

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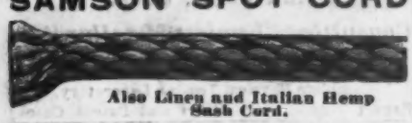

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Adv., Page 15

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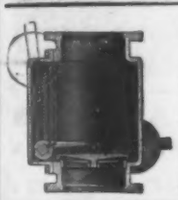

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THE IRON AGE

New York, Thursday, November 15, 1906.

The Illinois Steel Company's Joliet Extensions.

Description of the New Blast Furnace, Nut and Bolt Shop and Rail Joint Plant of the Joliet Works.

Extensive additions, including a blast furnace, rail joint shop and nut and bolt factory, as well as considerable improvements to the existing plant, were made during the past year at the Joliet, (Ill.) works of the Illinois Steel Company, Chicago. The pig iron producing capacity was increased to lessen the amount of outside supply required to meet the needs of the Bessemer steel plant, and the added output in the track supply department makes it now capable of producing 20,000 kegs of bolts and 11,000 tons of rail joints monthly, but this is already inadequate to the demands of the trade. By the construction of another stack the blast furnace capacity has been brought up to 1600 tons daily, which is still under the 2200 tons used in the steel works. The remainder required is shipped from Chicago plants of the company and is melted in cupolas at this plant. The iron shortage, from which all of the steel works have been suffering the entire year, made rapid construction of the furnace a necessity and its erection was encompassed in record time for the West—seven months and eight days—ground having been broken on January 23 and the torch applied on September 1. The speed with which the bolt factory was erected was also remarkable, the first bolt having been made on July 31, although work was not begun until late in April.

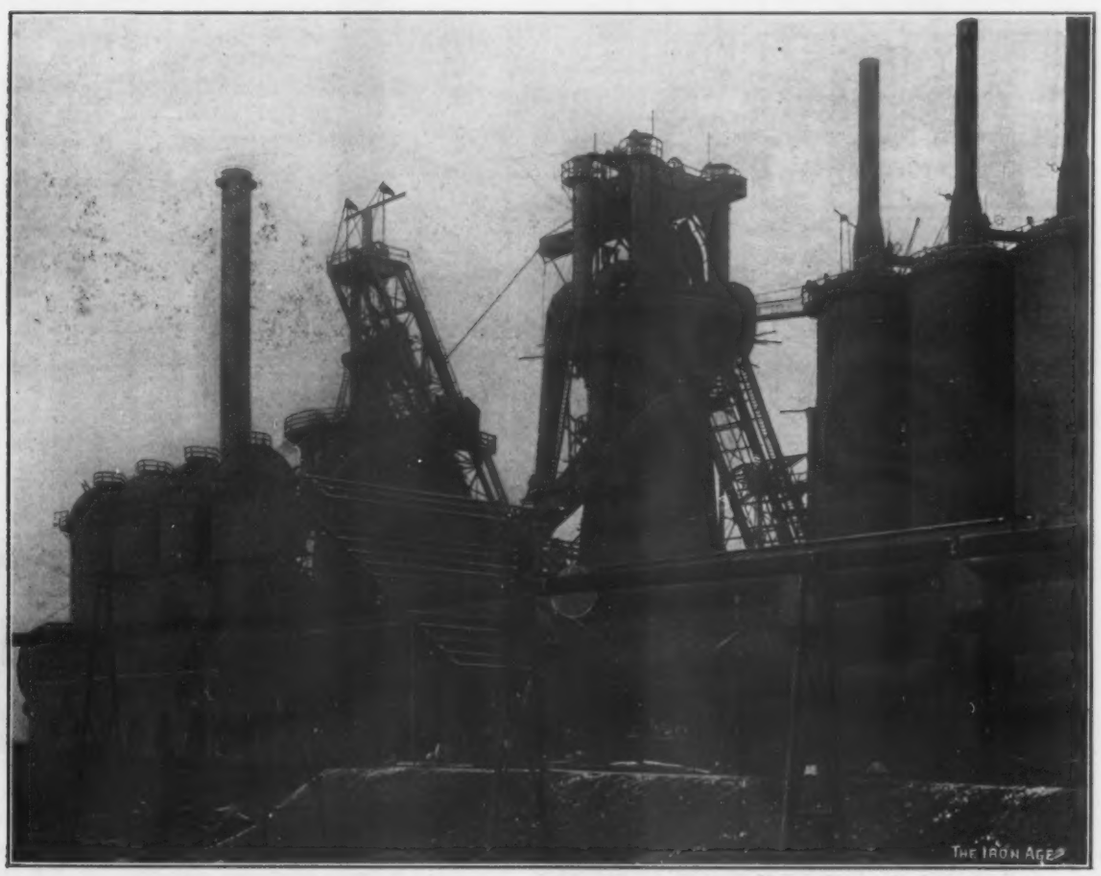


Fig. 1.—Blast Furnace No. 4, Joliet Works, Illinois Steel Company, Showing the New Stack on the Right and the New Stoves on the Left.

The stack of blast furnace No. 4 was built on the site of old No. 3, which was torn down in 1903. The latter remained in operation while the new No. 3 was built nearby and the stoves of the old stack were connected with the new furnace. This left the site of old stack No. 3 vacant, although its stove remained in operation, and in this space, between stack No. 3 and its stoves, the stack No. 4 was built. It then became necessary to locate the stoves for the new furnace on the site that would naturally be occupied by the stoves for No. 3, and as the latter has been kept in operation continuously it became necessary to connect furnace No. 4, shown on the right in Fig. 1, with the stoves at the left, which are shown at the right in Fig. 2. The system of cross-piping from the stoves to the furnaces is clearly indicated in the ground plan of furnaces Nos. 3 and 4, Fig. 3. As soon as operations permit, however, furnace No. 3 will be connected with the new stoves and No. 4 with the old stoves of No. 3.

The new stack, a cross section of which is shown in Fig. 4, has a capacity of 400 tons daily, is 90 ft. high, with a bosh diameter of 22 ft. The hearth is 15 ft. 6 in. in diameter, stock line 16 ft., and the batter is 0.79 in. to the foot. It is provided with a closed top equipped with the Baker-Newman distributer, described in *The Iron Age* July 26, 1906. The general arrangement of the head frame is out of the ordinary, and includes numerous improvements that have already proved their value, and together with the four bleeders, which are an innovation in

Western furnace practice, and the top operating machinery, are shown in detail in Fig. 5.

The girder on the head frame for handling the bells and other parts is 32 ft. long on one side and 24 ft. on the other. The hopper, gas seal and other parts are made in two sections, so that when lifting out and replacing the large bell they can be set to one side on the platform, leaving ample room for handling the large bell, which is raised and lowered from the side of the girder having the longest extension, permitting the bell to freely pass the furnace platform as well. In addition the head frame is absolutely free of all cross bracing and ample free space is thus provided for the handling of all parts. Being constructed independent of the bleeders, the latter can expand and contract without interfering with the head framework. The bells are operated by steam cylinders controlled from the stock house, the large cylinder governing the movement of the large bell and the small cylinder the small one. The four bleeders rise to a height of 36 ft. from the platform of the furnace top, are 3 ft. 6 in. in diameter in the inside and have an outside diameter of 4 ft. 4 in. The four downcomers connect with the bleeders at points about 9 ft. above the platform and the connections are so made that in the event of an explosion the coke, ore, &c., is free to rise the full height of the bleeders without passing down the downcomers into the dustcatcher. The burden carried out by the explosion falls back into the furnace, and, in addition, less dust passes off with the gas, as the latter is taken off at a point a little higher above the stack than is customary for these connections. The furnace is served by a double skip, electrically operated, having cars of 120 cu. ft. capacity each.

The construction of the dustcatcher, which is 25 ft. in diameter, is unique, being provided with an internal hopper which to some extent reduces the swirling motion of the gas and dust and permits the dust to settle before the gas passes out into the gas main. The downcomers are 6 ft. in diameter and enter the dustcatcher at a tangent. The latter has a chute with two openings controlled by a gate, so that the dust can be delivered directly into cars or can be dumped into a bin from which it is discharged into barrows. This bin is connected with the stock house by a tunnel, permitting the barrow man to take it directly to the skip car. The cast house is 58 x 115 ft., of steel construction, with a 45 deg. roof covered with steel plates 3-16-in. thick. With the exception of Sundays, the metal is run into ladle cars and delivered directly to the Bessemer plant. The slag is run into cinder ladles and is used for filling purposes.

The ore bins for this stack are double, 120 ft. long, and are of steel construction throughout. The ore is dumped into the skip cars from barrows, although the coke is dropped directly into the cars from the coke bin, which is above the skip pit. The limestone pockets are of wood and have a length of 80 ft.

The four stoves are of the four-pass, self-cleaning type, 100 ft. high and 25 ft. in diameter. A platform of steel and reinforced concrete extends around the stoves at a height of 9 ft. above their foundation and is on a level with the furnace floor, from which the gas, cold blast and chimney valves are operated.

Fig. 2.—The Skip Side of Blast Furnaces Nos. 3 and 4, Showing New Stoves on the Right and New Stack on the Left.

The self-cleaning features of the stoves are shown in Fig. 6, the bottom being so arranged that the combustion chamber and the two middle passes where the bulk of the dust settles, clean automatically. This is accomplished by sloping the bottoms of the second and third passes at angles of 35 degrees, until they meet and from a valley. This valley in turn is sloped to an angle of 35 degrees from the middle of the stove to the sides, where doors are provided for cleaning out the dust. The bottom of the combustion chamber has a slope of 45 degrees and is provided with a separate cleaning door. Thus, to clean a stove it is only necessary to open three doors, and the dust flows down the slope freely, as the angles of the bottom are such that there is little danger of the dust adhering. No provision is made for cleaning the fourth pass, as the deposit of dust in this section is very small. As a result of this construction it is only necessary to throw off the stove a short time for cleaning and the labor is greatly reduced. The stoves and stack were built by the W. B. Pollock Company, Youngstown, Ohio.

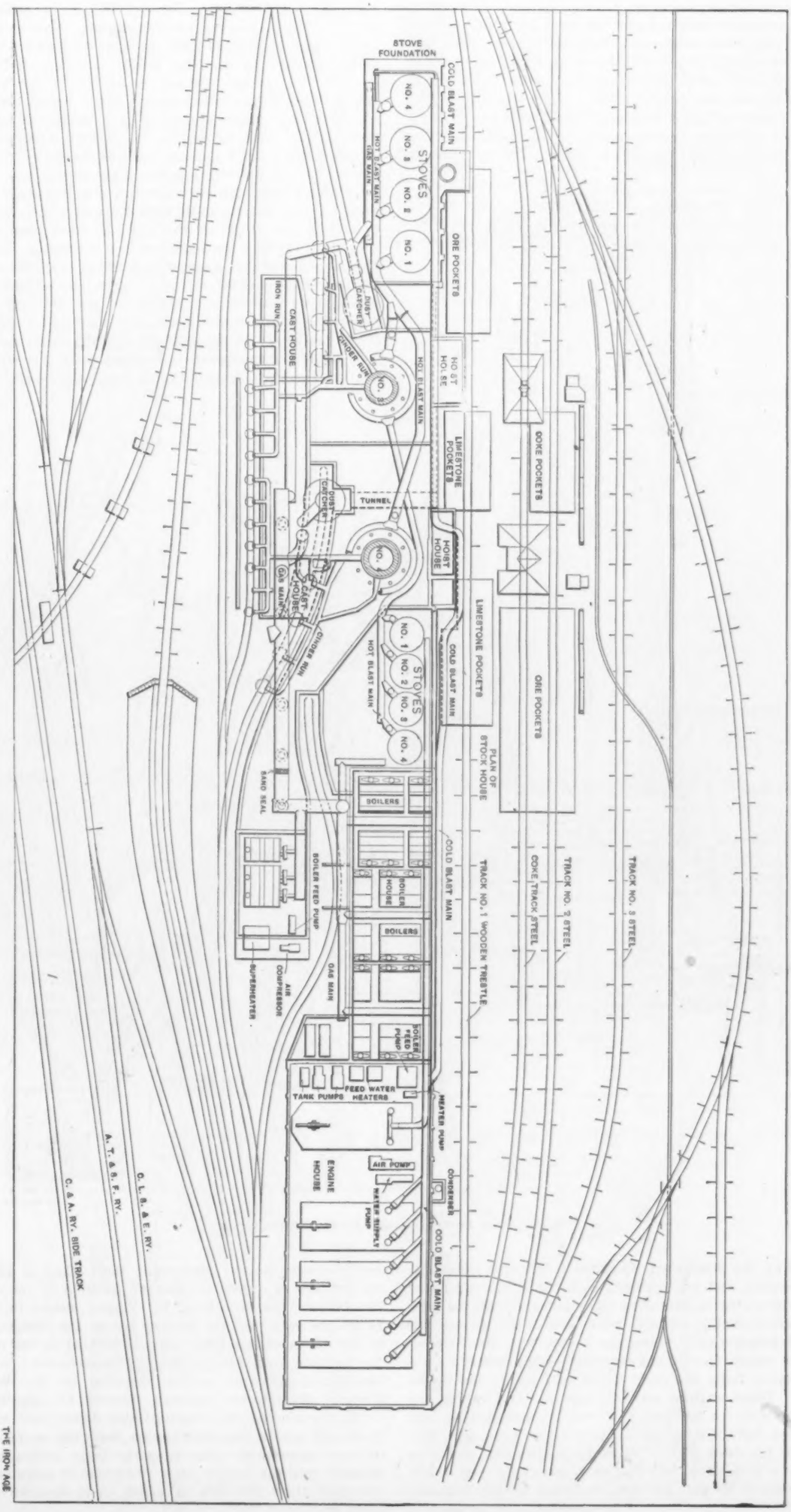


Fig. 3.—General Plan, Showing the Present Cross-Connecting of Furnaces Nos. 3 and 4 and Their Stoves.

To provide for increased blowing capacity three of the old engines are being replaced by three horizontal quarter crank compound condensing blowing engines, each having a 44-in. high pressure cylinder, an 84-in. low pressure cylinder and two 84-in. air cylinders with 60-in. stroke. These engines are designed for a maximum steam pressure of 150 lb., and a maximum blast pressure of 30 lb., and run at varying speeds, according to requirements, of from 40 to 60 revolutions per minute. They were installed by the Southwark Foundry & Machine Company, Philadelphia, and are equipped with the company's latest improved air valve gear with rectangular valves, the inlet being controlled positively, while the outlet valves are opened automatically when the pressure in the blowing cylinder equals that in the receiver; at the proper time a cam driven from the main valve gear closes the outlet valves. These engines are arranged for the Gayley dry blast system. In addition an 84-in. Tomlinson condenser has been installed by the Allis-Chalmers Company, Milwaukee, provided with a 10,000-hp. circulating pump, as well as a 20 x 28-in. two-lobe cycloidal pump with a displacement of 85 gal., per rev., installed by the Connersville Blower Company, Connersville, Ind., and driven by a 16 x 18 in. Murray vertical engine. Water tube boilers having a capacity of 4200 hp. in 12 units of 350 hp. each were furnished by the Rust Boiler Company, Pittsburgh.

The nut and bolt factory is housed in one building, 500 ft. long, with a width at one end of 58 ft. and 63 ft. at the other. It is of steel, with a reinforced concrete roof. Paralleling its length on one side are standard gauge tracks over which the steel in the form of bars is received from the rolling mills. This material is unloaded directly from the cars through side openings in the building, and the furnaces have been arranged in a row extending the length of the plant in close proximity to this side to reduce the handling to a minimum. The bolt department occupies a space 63 x 260 ft., and the remaining 240 ft. is devoted to the manufacture of nuts. The material in its various stages of manufacture moves across the width of the plant, the shipping tracks paralleling the length of the side opposite the receiving end.

The bolt department is equiped with 11 coal fired heating furnaces, which receive their air supply from a

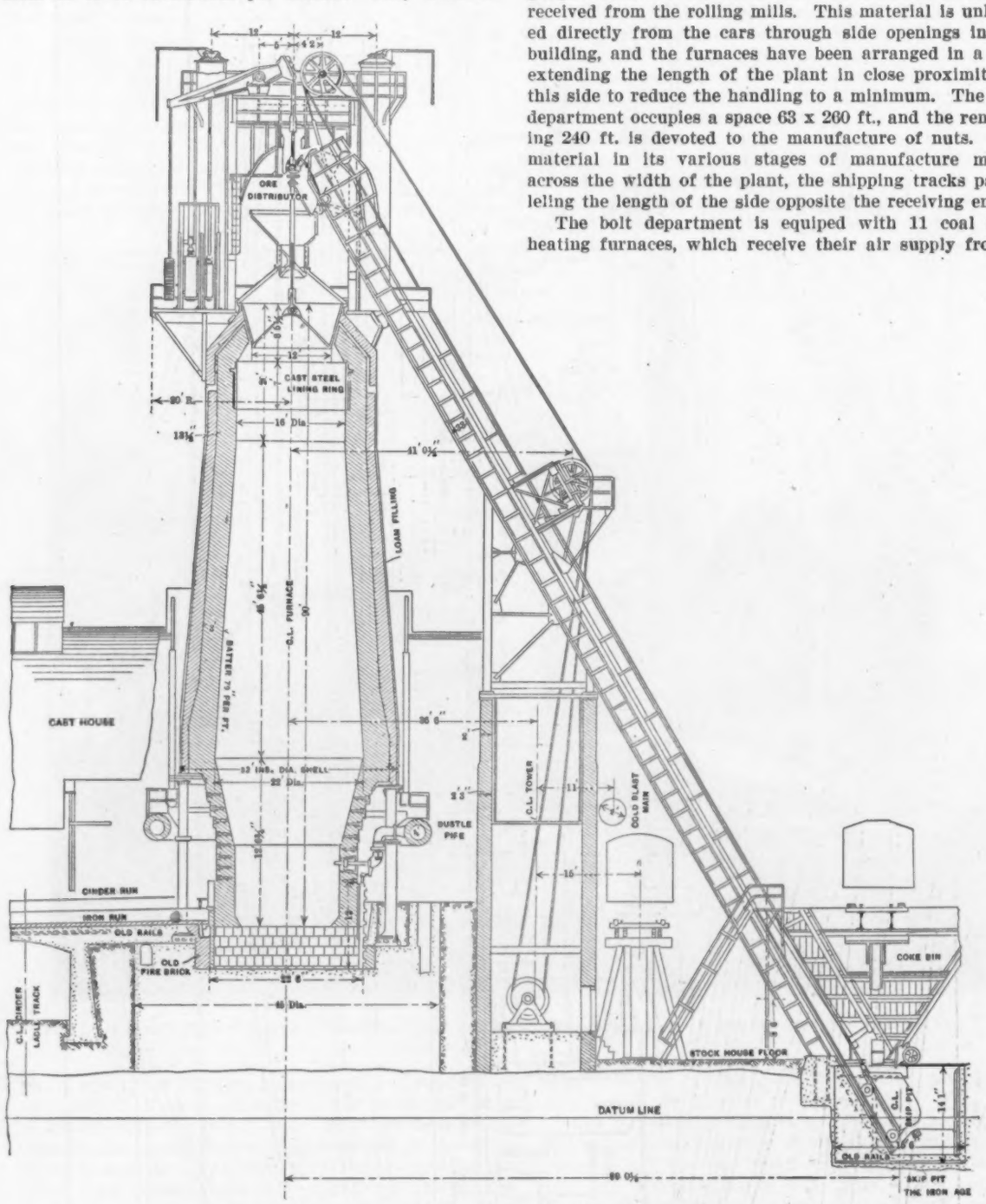


Fig. 4.—Cross Section through Blast Furnace No. 4.

motor driven No. 10 Sturtevant fan. Coal is fed into the furnace by automatic stokers installed by the American Stoker Company, Erie, Pa., clearly shown in Fig. 7. It will be seen that the stokers are on the charging side of the furnaces, whereas they are located in the rear of the heating furnaces in the nut department. A 3-ton electrically operated trolley, installed by the Whiting Foundry Equipment Company, Harvey, Ill., operates on a track extending the length of this department and immediately above the bins which feed the stokers, and carries buckets of 1-ton capacity from which coal is dumped into the hopper bins. The coal is elevated by a conveyor from the cars in which it is received into a

steel bin of 50 tons capacity, located on the outside of this end of the building, and having an inclined bottom, the coal is dropped into the 1-ton trolley buckets as required. To complete the system the trolley track extends through the building and the siding has an opening for the trolley. From the bolt headers, 11 in number, which are located at the side of the furnaces, the bolts are dumped into tumblers, after which they are threaded and pointed. The remaining equipment consists of 6 roll threading machines, 6 bolt pointers, 12 bolt cutters, and an annealing furnace. The machines are all belt driven from an overhead shaft driven by a 30-hp. motor at one end and a 75-hp. motor at the other, which also operates the fan. The finishing end of this department is shown in Fig. 8. The equipment of the nut department consists of eight coal fired furnaces provided with auto-

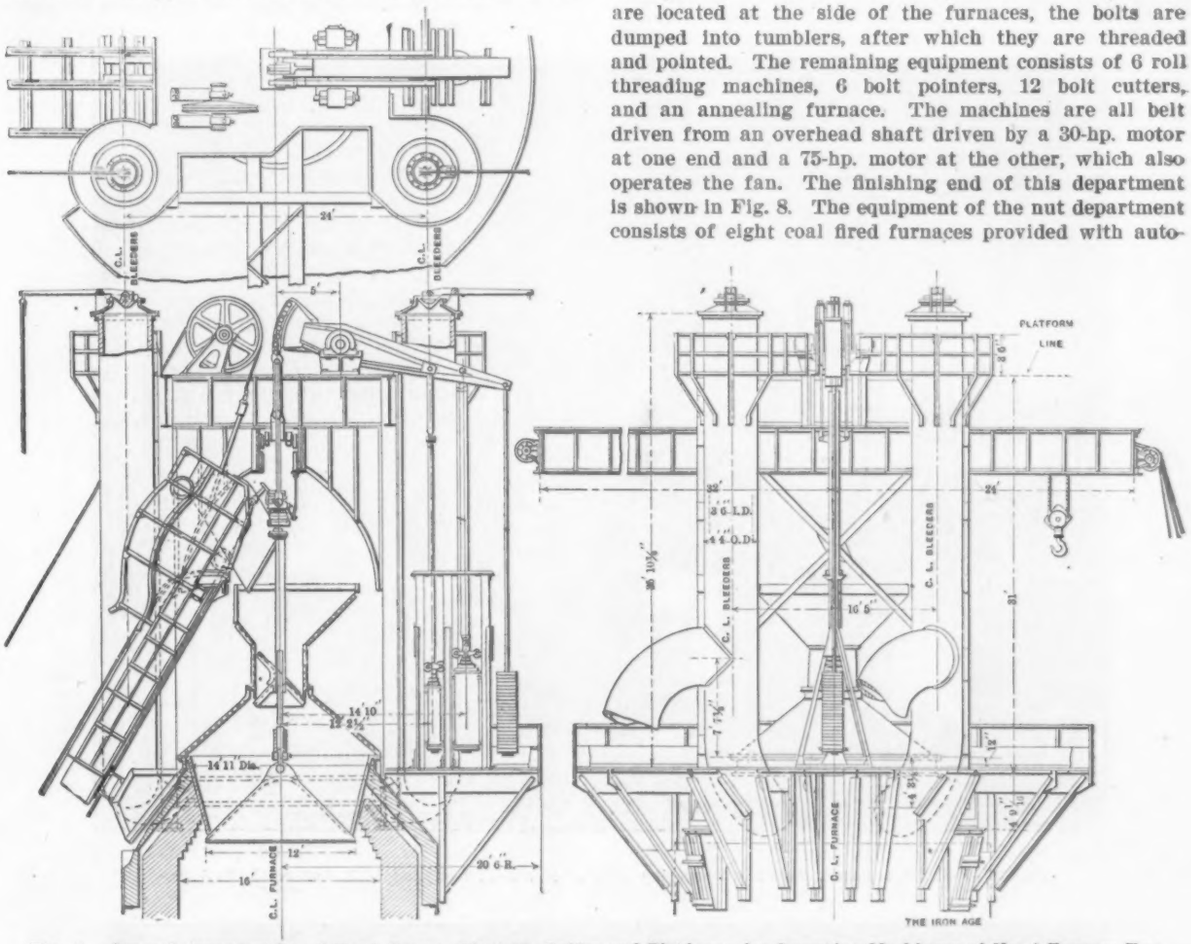


Fig. 5.—General Arrangement of Head Frame, Bleeders, Bridge and Platforms for Operating Machinery of No. 4 Furnace Top.

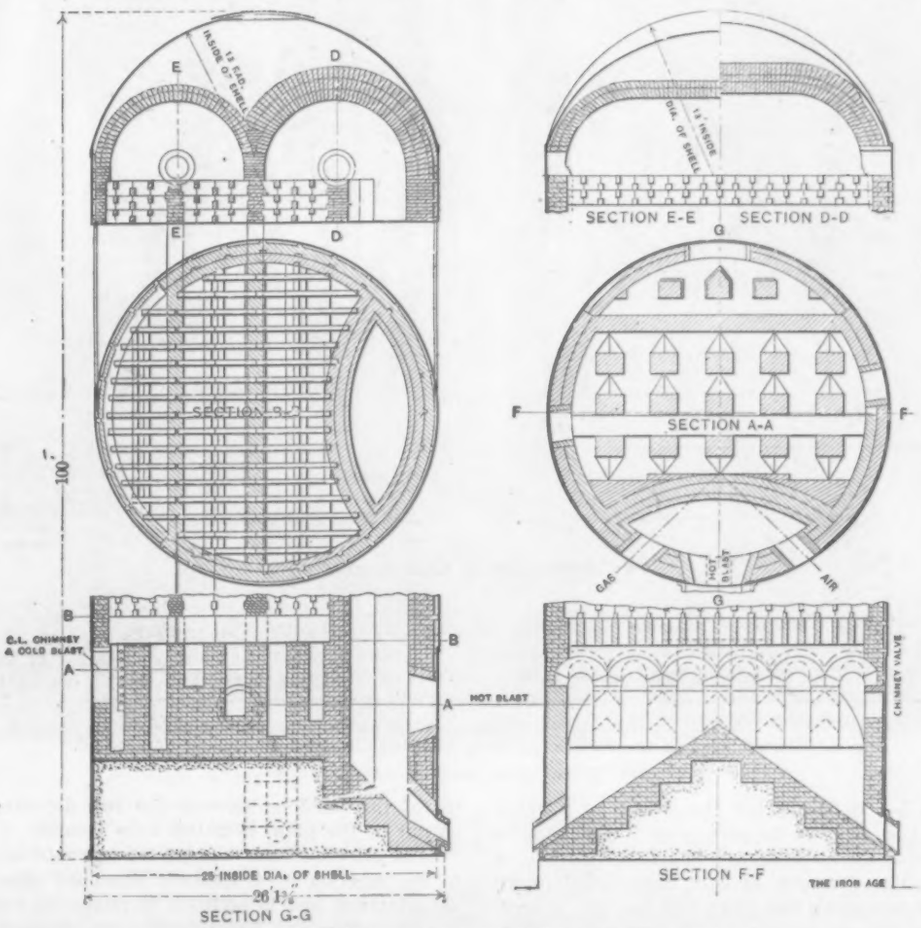


Fig. 6.—Detail Sections of One of the Stoves for No. 4 Furnace.

matic stokers, the coal handling equipment being similar to that of the bolt department, although an entirely separate system, its large bin being located outside of the opposite end of the building. Air for the furnaces is furnished by a No. 10 Sturtevant fan, driven by a 20-hp. motor, while the 15 nut tappers and 9 nut shavers are belt driven from an overhead shaft operated by a 50-hp. motor. The furnaces in both departments were designed by the company's engineers, and use coal in preference to other fuel on account of its lesser cost. The automatic stoking and coal handling equipment has proved a great saving in labor and has materially increased the output of the furnaces. A machine shop, tool room and the inspection office are located in the center of the building between the two departments. The output of the plant is 20,000 kegs monthly.

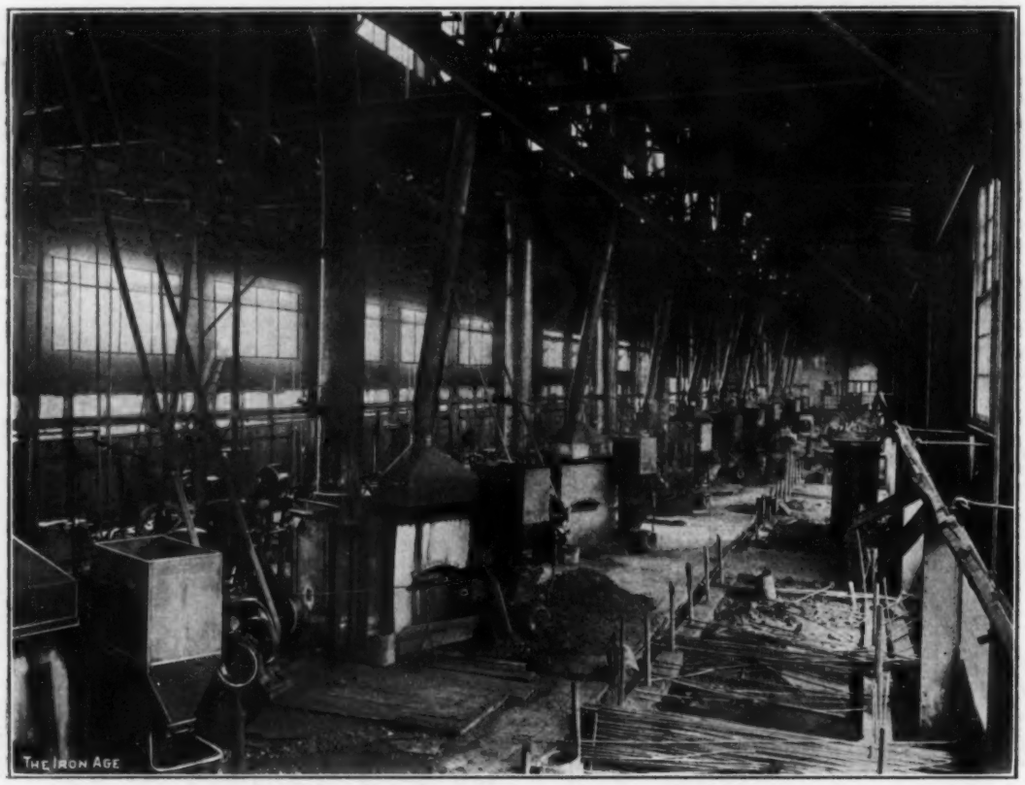


Fig. 7.—Bolt Department, Showing Operating Side of Furnaces Equipped with Automatic Stokers.

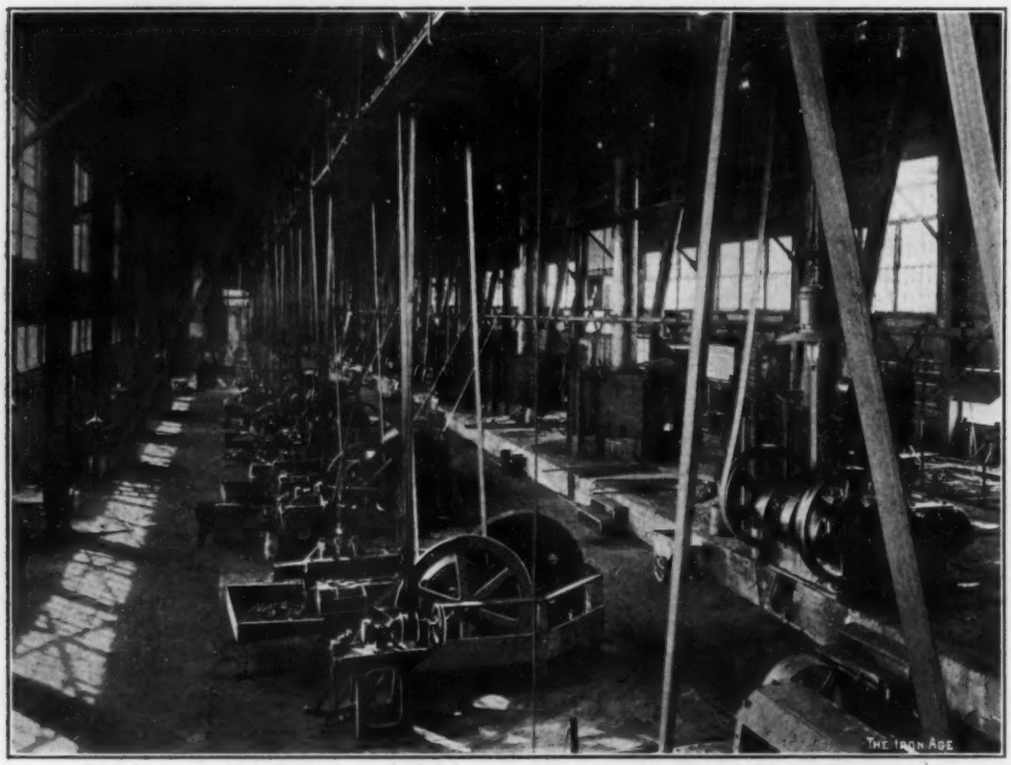


Fig. 8.—General View in the Bolt Department, with the Finishing End in the Foreground.

The growth in the demand for patented rail joints led to the erection of a specially equipped plant for their manufacture, and in addition to producing splice bars of the continuous and Wolhaupter types, standard joints are

also made. The volume of this trade is indicated by the fact that a capacity of 150,000 tons annually has been provided and the output now averages 14,000 tons a month. Both joints are made from special sections rolled in the billet mill, and bars in long lengths are delivered by a conveyor from the rolling departments to the splice bar storage yard, which adjoins the shop.

The building is of brick and steel, 40 x 200 ft., with 16-ft. lean-to half its length, in which the continuous heating furnaces are located, shown in Fig. 9. The Wolhaupter joint is completed in three operations, while the continuous joint is heated and pressed before being finished. The bars are delivered to the shears from the storage yard by conveyors, and after being sheared the required length are slotted and then punched. The machines for these successive steps are set close to one another to minimize handling. As the angle of the base of the continuous joint must fit the rail base almost per-

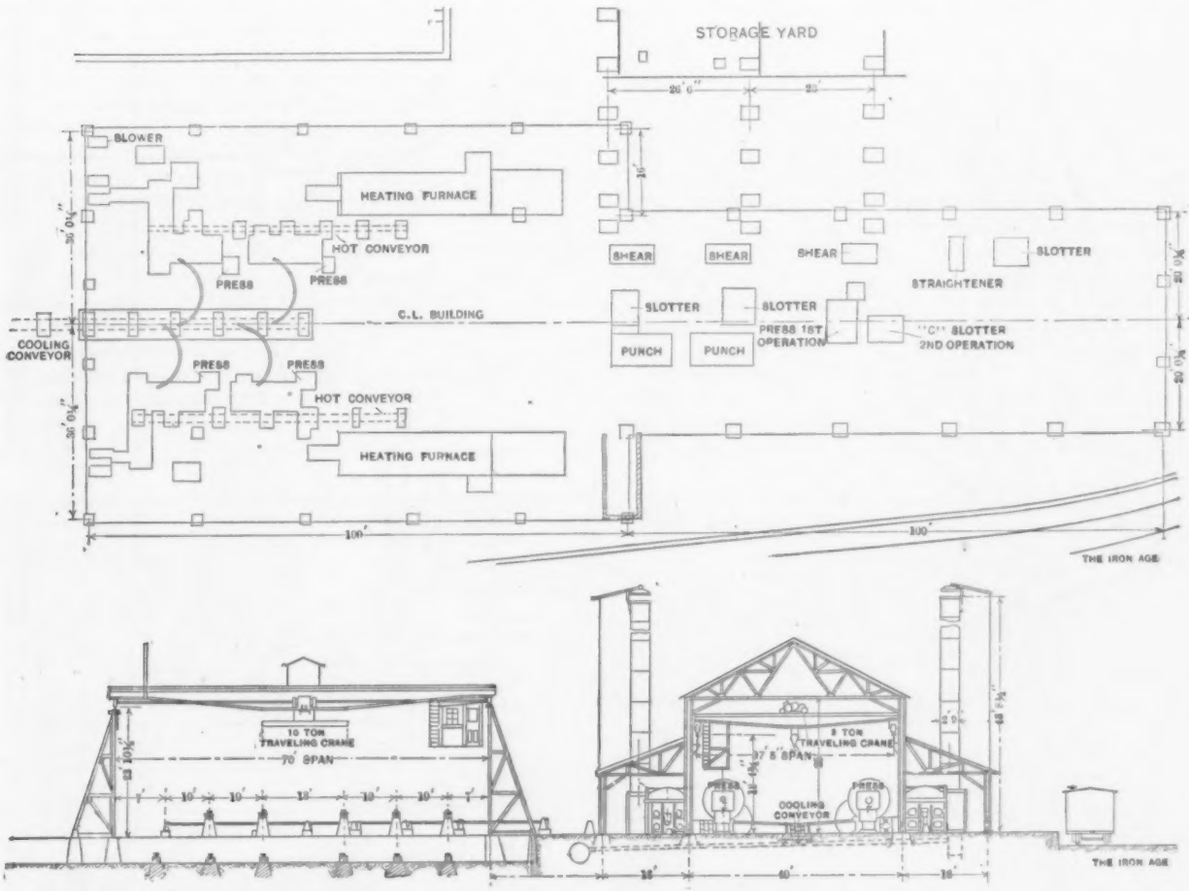


Fig. 9.—Plan of the Splice Bar Mill, Showing Location of Machines, and Transverse Section, Showing Relation to the Storage Yard.

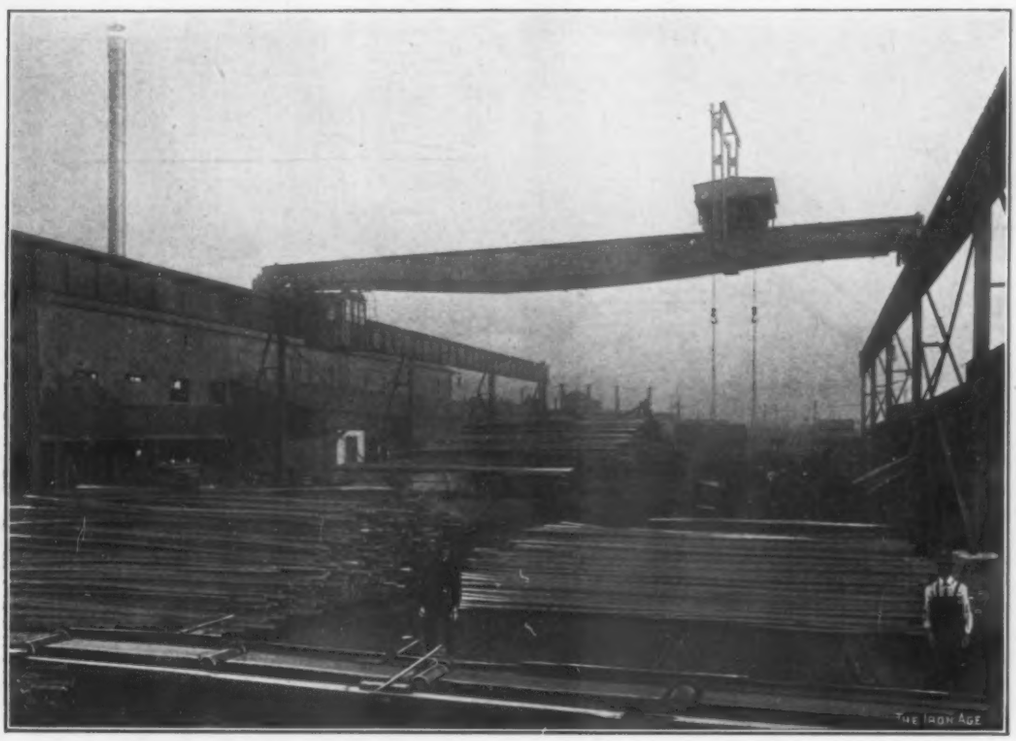


Fig. 10.—The Storage Yard Adjoining the Splice Bar Shop.

fectly and as this angle cannot be always depended on in the rolling, the joints, after being slotted and punched, are heated in the continuous furnaces and pressed to the proper degree while hot. Two continuous heating furnaces have been provided, one located in each lean-to. After being slotted and punched the sections are fed

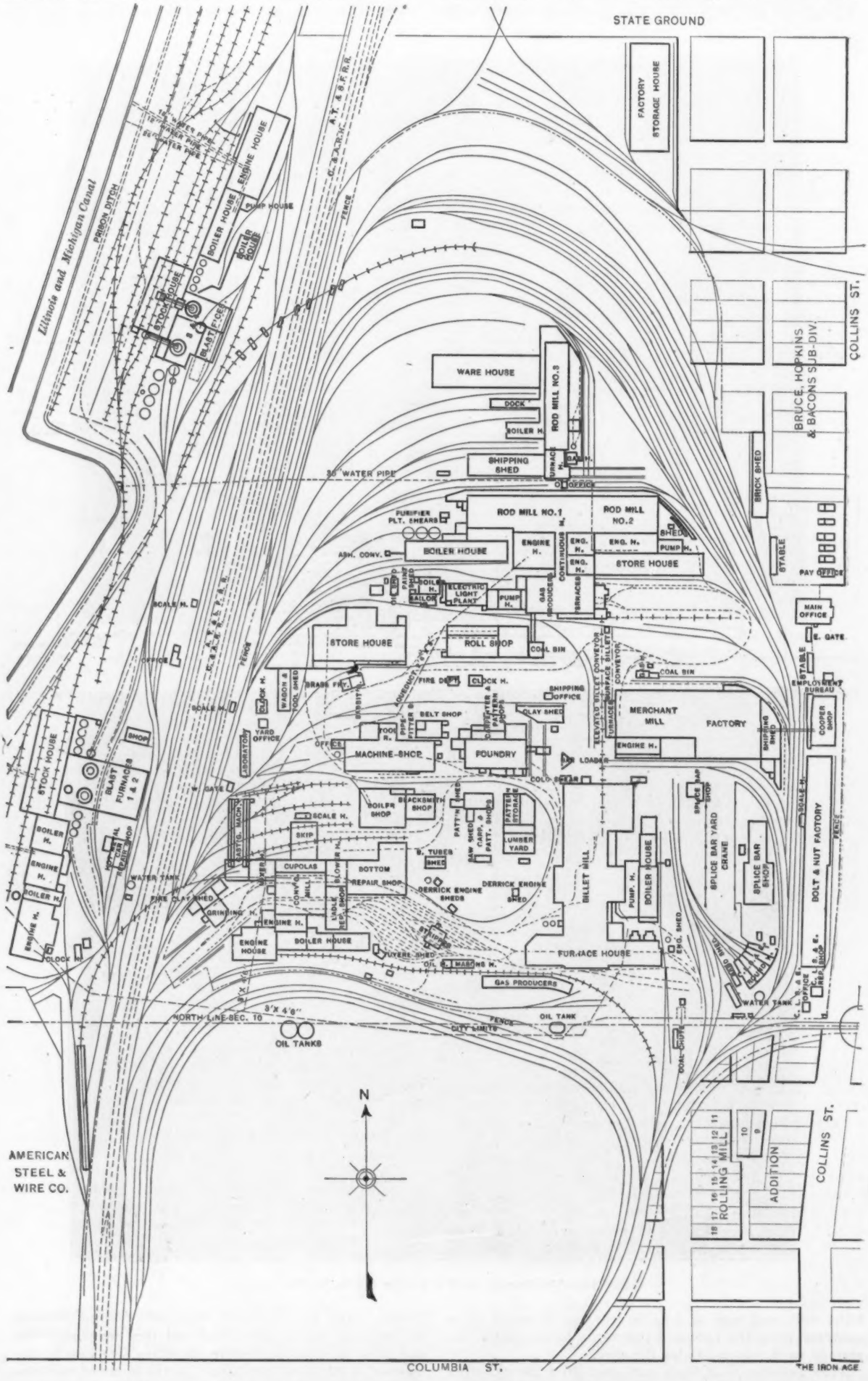


Fig. 11.—Plan of the Entire Joliet Works of the Illinois Steel Company.

into the rear of the furnace and are taken out in the side at a point near the front. They are then delivered to hot conveyors and carried to the presses, two being required for each furnace. From the presses they are skidded to a cooling conveyor, which carries the joints into the storage yard, where they are piled or are loaded on cars for shipment. The shipping tracks parallel one side of the plant, and the sequence of operation carries the material across the width of the plant. All of the tools are driven by individual motors mounted on the machines. A 5-ton electric traveling crane operates the length of the center span. The bar storage yard, Fig. 10, is commanded by a 10-ton electric traveling crane, having a 70-ft. span, installed by the Alliance Machine Company, Alliance, Ohio. After the bars are received from the billet mill they are carried in bundles by the crane and delivered to the skids, which are slightly inclined toward the conveyors which carry the bars to the shears.

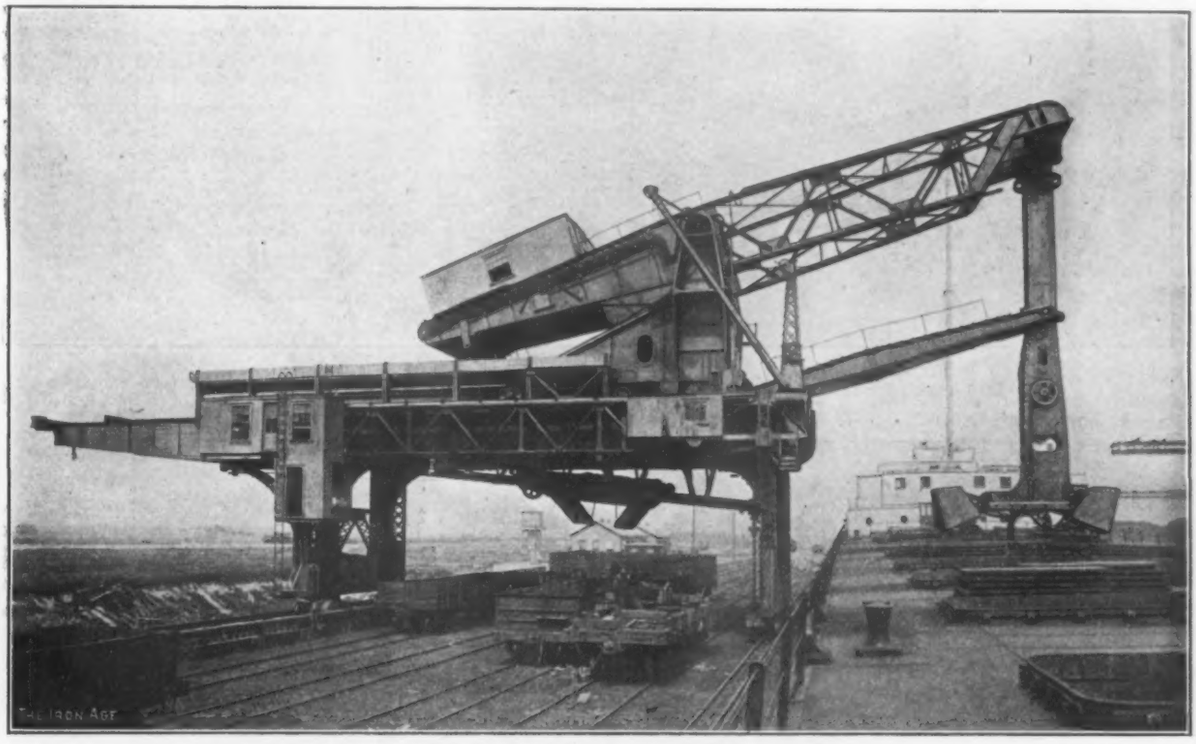
Two additional machines will be added to the spike manufacturing department, and a second pig casting machine has been installed by Heyl & Patterson, Pittsburgh. A map of the plant, including recent additions, is shown in Fig. 11. The improvements were made under the direction of D. R. Mathias, general superintendent; J. A. Dyblie, chief engineer, and W. F. Rust, chief draftsman.

A New Hulett Ore Unloader at Buffalo.

The latest installation of an electrically operated Hulett automatic ore unloading machine is that erected at the docks of the Pennsylvania Railroad, Buffalo, N. Y., by the Wellman-Seaver-Morgan Company, Cleveland, Ohio. As in the case of the other unloaders of this type previously installed, the machine handles an enormous grab bucket with an average capacity of 10 gross tons of iron ore. The spread of the bucket when open is over 18 ft., and by telescopic motion it can be extended still farther, thus enabling it to cover a large area in the hold of a boat, as it will reach more than half way from the center of one hatch to the center of the next when these hatches are on 24-ft. centers. The bucket is carried on the end of a vertical dependent leg which is mounted on trunnions at the top, so that the bucket may rotate when operating in the hold of the boat, allowing it to reach out in any direction. The walking beam is mounted on a trolley or carriage, which carries it over the boat and back again over the dock.

The power for operating the unloader is furnished by motors, which receive their current from sliding contacts. An 85-hp. motor opens and closes the bucket; one of 150 hp. hoists the walking beam; one of 50 hp. trolleys the carriage in and out on the bridge, and a 75-hp. motor operates the bucket car and moves the entire machine along the dock. The ore may be unloaded into railroad cars on tracks underneath the unloader, or may be carried back on the cantilever of the unloader and delivered into a storage pit at the rear of the dock. In either case it is delivered from the bucket into a special bucket car or traveling hopper, provided with folding chutes for discharging the material into cars or the storage pit. This bucket car travels back and forth as required, and on reaching the desired dumping point is automatically discharged.

A comprehensive description of two machines of almost the same construction was given in *The Iron Age* August 3, 1905, these being the unloaders installed at the docks of the National Tube Company, Lorain, Ohio.



The Hulett Automatic Ore Unloader at the Pennsylvania Railroad Company's Docks, Buffalo, N. Y., Installed by the Wellman-Seaver-Morgan Company, Cleveland, Ohio.

To circumvent the expensive and tedious process of copying illustrations and printed matter by photography a German inventor has suggested a simple expedient. He places upon a table the page or cut to be copied, and above it, at an angle of about 45 degrees, is placed a mirror. The reflection of the copy in the mirror is focused on the ground glass in the camera, but then, instead of using a plate, a smooth faced bromide or negative paper is used for the exposure. The result is of course white letters or lines upon a black ground, but this is not usually objectionable. The use of the mirror is necessary to reverse the view, which would otherwise be inverted.

The great iron statue of Vulcan, which was one of the features of the Alabama exhibit at the St. Louis Exposition, has been removed to the Alabama State Fair grounds on the outskirts of Birmingham, and will probabyl have a permanent place there.

All the iron and steel plants and coal mines of Nova Scotia report this the most profitable year in their experience.

The Howard Gasoline Motors.

Of the already large number of gasoline engine manufacturers it is probably safe to say that more than one-half devote themselves to the building of automobile and marine motors. The present popularity of automobiles appears to have prompted the designer and builder of the automobile and marine motors, herewith illustrated, W. S. Howard, Yonkers, N. Y. Their simplicity is noticeable, but it is of the kind that makes for more efficient operation or improved convenience in handling, rather than lower cost of manufacture. Fig. 1 shows two views of the automobile motor, and Fig. 2 the auto marine

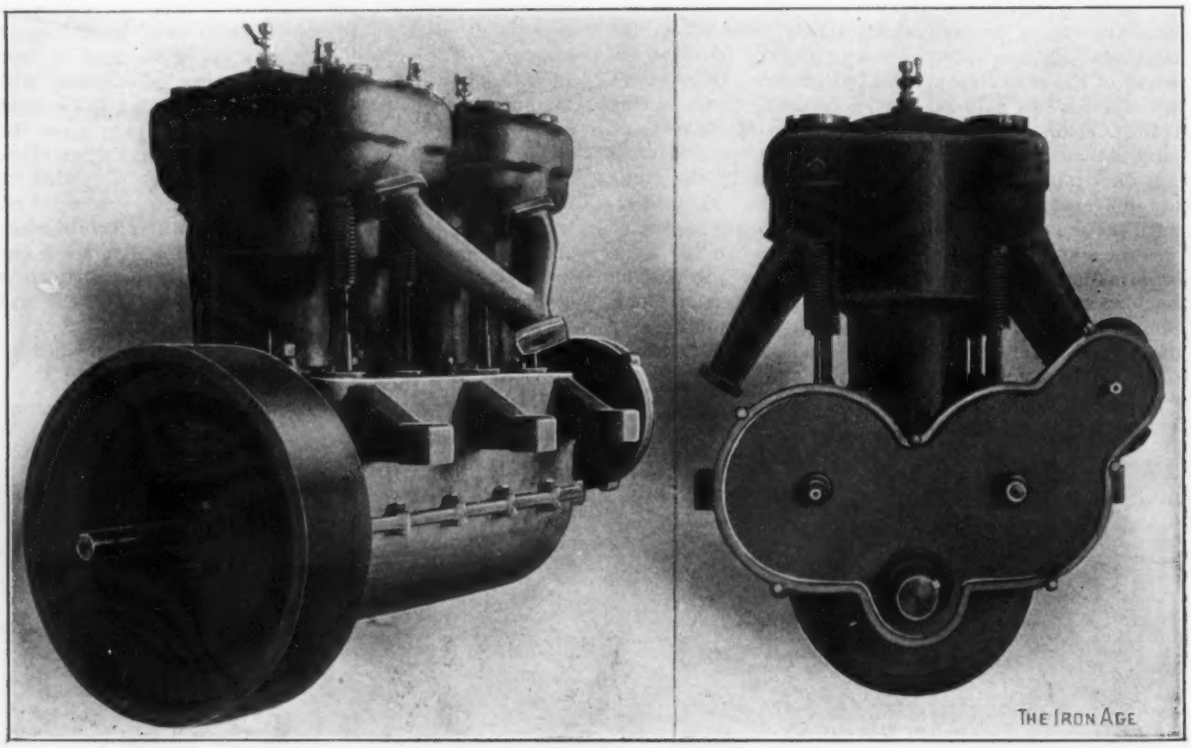


Fig. 1.—Two Views of the 40-hp. Mercedes Type Auto Motor Built by W. S. Howard, Yonkers, N. Y.

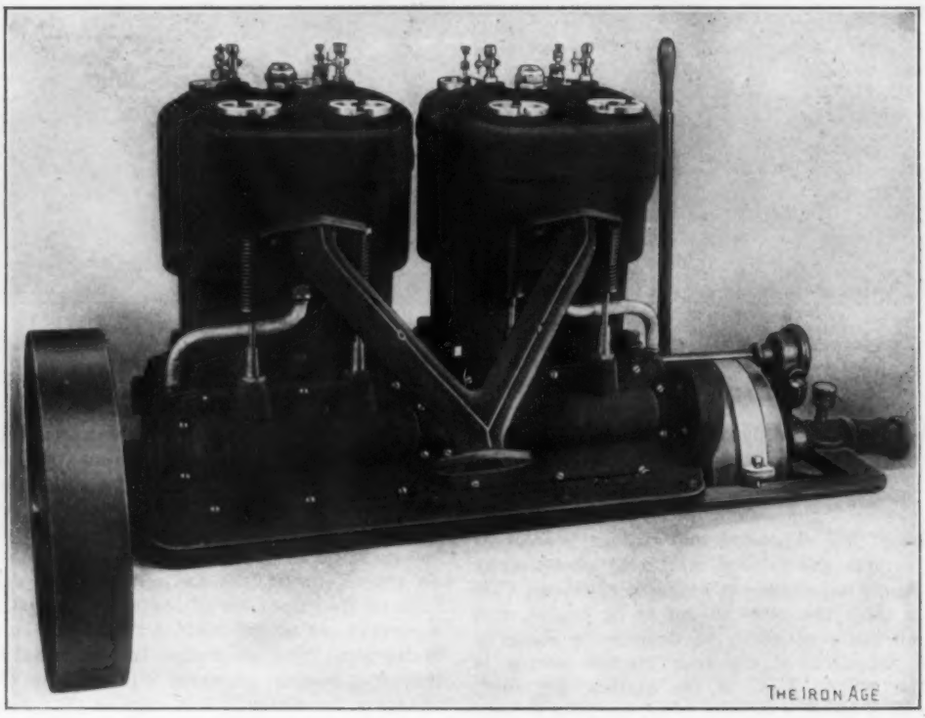


Fig. 2.—The Howard Auto Marine Motor.

and motor boats is responsible for the remarkable development in this special class of motor, but at the same time competition is keen and the principal aim of most manufacturers is to reduce the cost of production. It is somewhat unusual then, and therefore interesting to find a gasoline motor in which the best has been sought almost without regard to cost. Such a motive, however, motor, as it is called. All of the details have been sufficiently carefully worked out to deserve attention, but the principal interest attaches to the cylinder.

As will be noticed the cylinders are cast in pairs, with the water jackets and cylinder heads integral with the main casting, as shown in the cross section, Fig. 3. Each twin cylinder casting for the 40 hp. size weighs 96 lb.

The making of so intricate a casting with its cored spaces and required uniform wall thicknesses is a foundry achievement worthy of description in itself, but as a recent issue of *The Iron Age* * had a very complete account of the making of a similar casting, it will be passed over at this time. Attention is particularly directed to two features in the design of this cylinder, the provision of 45-degree inlet and exhaust passages for the easy ingress and egress of the gases, and the arched form of the cylinder head which gives strength that is further increased by having only an unusually small opening through its center. The valve chambers on either side open into a single common inlet on one side and exhaust on the other. Since both sides are exactly alike expansion does not tend to curve the bore of the cylinder, as is the case when all of the valves are on one side. By placing the spark plug over the inlet valve it is always in fresh, easily ignited gas and free from oil and burnt gas.

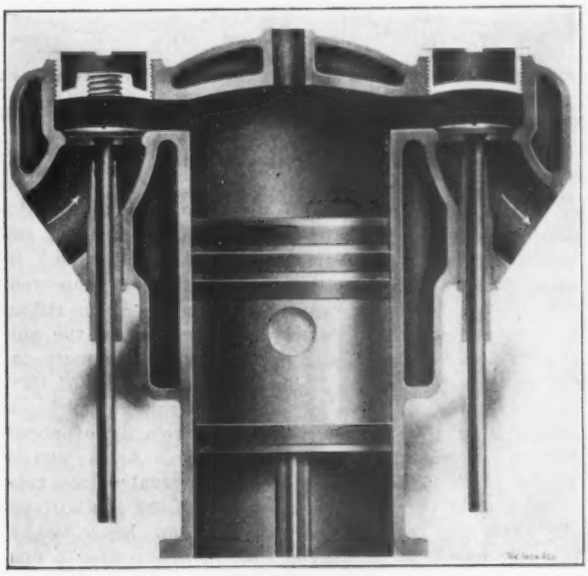


Fig. 3.—Transverse Vertical Section of the Cylinder Casting.

The absence of sharp turns in the flow of the gas is to be noticed in the piping, Figs. 1 and 2, as well as in the cylinder casting. The valves are all interchangeable, and are mechanically operated by cam shafts of the form shown in Fig. 4, the unique feature of which is that it is in one solid piece. The cams are hardened, and the rolls and pins are of tool steel, hardened and ground. As the cams are not separate and held in place by set screws, they cannot become displaced by even a slight amount, which is the cause of the irregularity in the sound given out by the great majority of gasoline engines. The explosions are perfectly timed, as a consequence of which the same amount of work is obtained from all of the cylinders. The valves are drop forged from nickel steel, and are annealed just before they are finished to final size. The guides are long and extend well up to the valves to protect the stems from the heat of the exhaust. The guides can be renewed, and are not in contact with the stems at the upper ends. The facility with which the valves may be removed is well indicated in Fig. 3, as is also the fact that the gas passes uniformly around the valves. The cooling water for the cylinder jackets is circulated by a gear driven rotary pump.

The connecting rods are hand forged solid from chrome steel and milled semihollow to a light section. The upper end has a 3-in. bearing on a 1¼-in. pin, which is hollow and only 3-16 in. thick, which is ample for the 5-in. cylinder. This pin is hardened and ground.

The pistons are provided with four rings each, all lapped with square joints. These rings are not only ground on the edges, but are held on a magnetic chuck and ground to a correct diameter after being lapped. As they fit the cylinder they do not have to be run in by a belt. The pistons are turned to size, annealed, and then ground to correct clearance for expansion. The top part of the piston is smaller, and does not come in contact with the cylinder walls, even under greatest load.

The crank shaft is hand forged under a steam hammer from high grade acid steel, which has about one-third greater tensile strength than the mild steel slabs from which crank shafts are usually cut. For a 40-hp. motor the shaft only weighs 38 lb. The main bearings are 4 x 1⅞ in., with pins 3 x 1⅞ in. and crank webs 2 x 1 in. The cranks are turned on a crank machine and the bearings are ground. The chamfered corners and hollow pins allow for the large size at such light weight.

The description of the automobile motor applies equally well to the marine motor. The same cylinders, valves, pistons and crank shafts are used, but instead of the aluminum base with its lower half removable without disturbing the bearings, the marine type base is used with a self-contained mechanical reverse. In both motors a complete lubricating system, not shown in the illustrations, is provided, being fed by a positive oil pump, distributing a regulatable amount of oil to each rubbing surface.

The auto motor illustrated is of 40-hp. capacity with 5 x 5½ in. cylinders, the size commonly furnished for that class of work. For marine service the engine is made in two, four or six-cylinder form in normal capacities ranging from 8 to 75 hp.

* September 13, 1906 ("Molding Automobile Engine Cylinders").

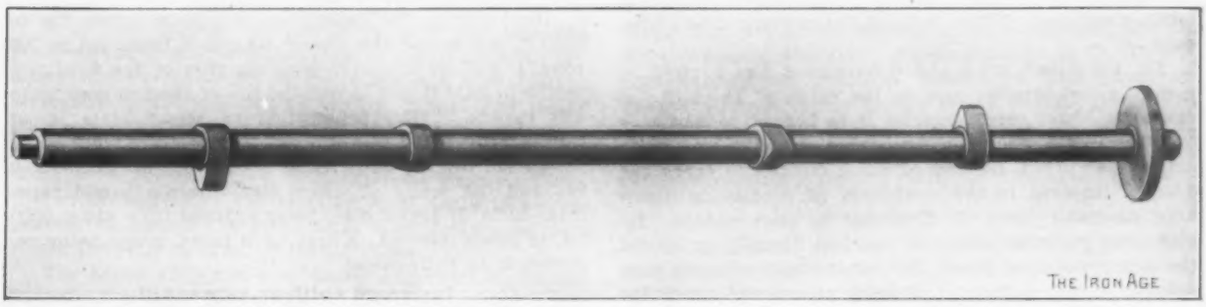


Fig. 4.—The One-Piece Valve-Actuating Cam Shaft.

It is said that the St. Louis & San Francisco Railroad Company has completed surveys for a proposed line from the Missouri River to New Orleans which is to be 171 miles shorter than any existing line from St. Louis to the Crescent City. The line is to be constructed in three divisions and to be completed in 1907. The first division, which will end at Shorepaugh, will have no grades greater than 0.3 per cent. The second division, extending to Mississippi Crossing, will have grades of a maximum of 0.2 per cent., while the third division will have none greater than 0.1 per cent. No curves on the line will be over 2 degrees.

In a paper before the Manchester Association of Engineers it was stated that a Diesel oil engine of 500 hp., using Galicia crude petroleum, showed a consumption of only 0.451 lb. per b.h.p. per hour. This oil costs 0.87 cent per lb., making the cost of fuel for 1 hp. hr. only 0.38 cent., or $1.95 per hour, for the full 500 hp. On this basis the fuel cost of 1 hp. year would be only $34.25.

The War Ordnance Bureau's Annual Report.

Condemnation of 12-in. Coast Defense Guns.

WASHINGTON, D. C., November 13, 1906.—The forthcoming report of Gen. William Crozier, Chief of the Bureau of Ordnance of the War Department, contains a discussion of the relative cost of Government work on ordnance material and of private manufacturers, showing an apparent advantage in favor of the former; a statement of much importance describing the remarkably short life of coast defense rifles of heavy caliber, which has induced the Department to substitute 14 and 16 in. guns for the 12-in. guns heretofore in use, an item of special interest to contractors for gun forgings, and a summary of machine shop equipment of the principal arsenals added the past year for the purpose of reducing the amount of work to be done by private contracts. The tendency of the ordnance service of the War Department, as reflected in this report, is to provide facilities whereby the Government may do practically all its own work in the manufacture of ordnance and supplies, limiting private establishments to the production of such heavy forgings as the Government cannot conveniently make. Following is an abstract of this interesting report:

Calculation of Shop Expenses.

In the last annual report of the Chief of Ordnance mention was made of an effort to improve the system of accounting in the Ordnance Department so as to determine more accurately the cost of the different articles manufactured by it, and it was stated that this cost would thereafter include, besides the indirect shop expenses, a proper percentage to cover the pay of the officers and enlisted men of the establishment, the general repairs and improvements to buildings, the clerical expenses, deterioration, and in general all those expenses which a private manufacturer must take into account, except profit. This percentage has been determined to be for the Frankford Arsenal 9, for the Springfield Armory 14, and for the Rock Island Arsenal 11.4. In comparing Government manufacture with that at private establishments certain advantages characterize each method. The private manufacturer is not restricted to eight hours of labor per day; this may or may not be an advantage, but there is no doubt of the advantage resulting from his relief from the necessity of paying for 15 days of vacation per year, for seven national holidays and for Saturday half-holidays during the summer months. The time for which the Government in this manner pays, without return in labor, amounts to 10 per cent. of the working time of the year.

On the other hand, the Government has a right to charge a less interest rate on the value of its plant, because its better credit enables it to borrow money at a less rate. Its losses by fire are also limited to those actually incurred, instead of being obliged to carry the "load" involved in the machinery of conducting insurance companies and the dividends to stockholders. Its high-class superintendence is also less liberally paid, and the deterioration of plant, like the insurance, is only that actually incurred, instead of being an amount which the manufacturer must often make large to cover himself against a lack of future orders, but which he rarely diminishes when the real cost of his plant has been actually covered. Added to all else is the profit, which the manufacturer will of course make as great as the conditions of industry allow. It is sometimes claimed that the private manufacturer has a stimulus spurring him to effort to reduce cost by improved methods and close supervision, which is lacking in a Government establishment. There is no necessity for the lack in Government establishments, if the career of the officers is made to be affected by their conduct of them, and there is the same possibility as in private establishments of reward to employees for valuable suggestions. Success in diminishing private cost does not by any means signify lower prices to the Government, but rather greater profit to the manufacturer.

Below is compiled a statement showing the contract prices and the arsenal cost of various manufactures of recent years. In some cases the contractors claim that their price was so low as to cause them a loss. The arsenal costs include all of the general percentages mentioned above. The evidence is in favor of Government manufacture, as will be seen from the following items:

3-in. field guns, model of 1902, contract price, $2499; arsenal cost, $2242.
3-in. field guns, model of 1905, contract price, $1990; arsenal cost, $1491.
3-in. field gun carriages, contract price, $3010; arsenal cost, $2292.
3-in. field caissons, contract price, $1522; arsenal cost, $1183.
15-pounder barbette carriages, contract price, $4042; arsenal cost, $3642.
15-pounder shrapnel, contract price, $3.96 each; arsenal cost, $2.83.
Ball cartridges for rifle, model of 1903, contract price, $42.50 per 1000; arsenal cost, $34.99 per 1000.

Short Life of Heavy Guns.

In the last annual report of the Chief of Ordnance of erosion in limiting the life of heavy guns, and of the possible necessity of finding some method of securing the necessary power less expensive than that involved in using the very high velocities of projectiles now employed, with the accompanying rapid wearing away of the rifling in such manner as to destroy the accuracy of the gun after a few rounds. Going into the subject in more detail and considering the 12-in. gun of the model of 1900 as an example, we have for the life of this gun, firing a projectile of 1000 lb. weight, with a velocity of about 2500 ft. per second, only about 60 rounds. As the gun is capable of firing for a considerable interval at the rate of 45 rounds per hour, it is seen that the limit of its life could be reached in less than an hour and a half. It has been considered that in attempting to run by fortifications guarding the entrance of a harbor the period that would elapse from the time that the leading vessel of the fleet would come within range until the last vessel would pass beyond the range of the coast guns would be about 2 hr.; it is therefore evident that a new 12-in. gun would not last through such an engagement. Similar statements can be made with regard to guns of smaller calibers, although as the caliber diminishes the admissible velocity increases. The 6-in. gun of the model of 1900, firing a projectile of 100 lb. weight with a velocity of 3000 ft. per second, would have a life of 150 rounds, corresponding to about an hour and a quarter at the rate at which the gun can be fired. It needs only a statement of the situation to show the necessity for doing something to meet it, notwithstanding that the accuracy of the guns could be restored by relining them at much less than their original cost.

By lowering the velocity of the 12-in. projectile to 2250 ft. per second the life of the gun is increased to 200 rounds, and by similarly lowering that of the 6-in. projectile to 2600 ft. per second the life of the gun goes up to 450 rounds. The penetration of armor plate is, of course, reduced by this process, that of the 12-in. gun at 10,000 yd. coming down from about 10½ in. to about 9 in., and the range at which its projectile would penetrate 12 in. of armor plate being reduced from about 8000 yd. to about 6000 yd., Krupp hard faced armor being referred to in both cases.

Increased Calibers Demanded.

To restore the offensive power the most obvious course is an increase of the caliber of the gun, and all considerations indicate that there is nothing against such a course and a great deal in its favor. A 16-in. gun has been successfully built and tested and there is no reason why this caliber should not be adopted for our guns of the highest power if it should be considered necessary. But let us examine an intermediate caliber. The design of a 14-in. gun has been laid down in this office, of which the weight is 49½ tons (111,000 lb.), the weight of the projectile is 1660 lb., and such construction has been adopted as will involve a muzzle velocity of 2150 ft. per second. The charge of powder required to produce this velocity is about 280 lb., as against 366 lb. for the 12-in. gun of the model of 1900.

Summarizing the results of tests and manufacturing data, it appears that by using in the situations requiring

the greatest power a 14-in. gun with 2150 ft. per second muzzle velocity of projectile instead of the 12-in. gun with 2500 ft. per second initial velocity we would secure a lighter gun, a cheaper gun, a heavier projectile, greater muzzle energy, a still greater proportion of energy at each distance beyond the muzzle, and a life four times as long.

The Taft Board for the revision of the report of the Endicott Board on coast defense has recommended the use of the 14-in. gun in place of the 12-in. in situations where the highest power is required, and this Department will hereafter construct guns of that caliber, abandoning as a maximum caliber the 12-in., which had been tacitly adopted.

New Construction and Improvements.

Congress at its last session made an appropriation of $165,000 for the establishment of an army smokeless powder factory. Steps are being taken for the selection of a proper site for the establishment of this factory, and when this site has been selected the work of erection of the factory will be pushed vigorously to completion. In the meantime plans and specifications for buildings and machinery are in preparation.

In the past year important additions have been made to the equipment of the Rock Island Arsenal. To the electric motors previously installed others have been added, bringing the total up to 107 motors, with an aggregate of 2539 hp. Forty-nine machines of various kinds have been added, most of them for bayonet manufacture.

The wing of the cartridge factory of the Frankford Arsenal in which is located the loading room has been extended 36 ft., adding greatly to the efficiency, and an abandoned boiler room in the machine shop building has been converted into a brass foundry, which is fulfilling all expectations as to economy and efficiency.

The Watervliet Arsenal is the army gun factory and supplies a large percentage of the cannon of all calibers used in the military service, together with the spare parts, tools, etc. The value of all material under manufacture during the year was $1,559,970.07, of which $850,679.74 was completed. The electrical equipment described in the last annual report continues to give entire satisfaction and has resulted in the increased output anticipated, amounting to from 25 to 50 per cent. on the different machines. Six induction motors, aggregating 140 hp., have also been installed for group driving, and individual motors have been applied to several of the larger machines in addition to those on the gun lathes. The lower shops have been equipped with motors for group drives, replacing the main belt and shaft drive from the water power in the form of electric current.

Watertown Arsenal.

A number of new machine tools have been installed in the machine and erecting shops of the Watertown Arsenal, and the efficiency of the shops has been further increased by the addition of electric cranes and minor improvements. The needed replacement of machine tools which are worn out or of insufficient power can be partially accomplished under appropriations recently made. The crane system in the erecting shop needs to be improved, to permit the economical manufacture of carriages for guns of 12 in. or higher caliber.

The smith shop has been busily employed to its full capacity. A large percentage of the forgings was made from steel ingots produced in the arsenal foundry, permitting prompt production and avoiding the delays incident to the purchase of billets from private steel makers. The present forging capacity is limited and the plant is not so conveniently arranged as is desirable. The weight of the largest forging made was 3 tons and the length of the longest about 18 ft. Such forgings tax the existing facilities to their utmost. Plans and estimates have been prepared for improving and modernizing this shop and for increasing its facilities.

The foundry produced about 2,000,000 lb. of steel, iron and bronze castings. The capacity of the small plant for producing steel castings has been practically doubled, so far as the production of individual castings is concerned, by the successful prosecution of experiments permitting the metal melted in two blows of the converter to be utilized for a single casting if desired.

Much work has been done at the testing laboratory. Investigative tests for the Department have included a continuation of examination of the metal in a 17-ton steel ingot fluid compressed by the Harmet process, frictional resistance tests on 6-in. projectiles in the rifle bores of sections of tubes, using different grades of metal for the rotating band, and examination of the conditions with reference to initial strain in the 8-in. B. L. rifle No. 1 type after the long continued firing incident to its endurance tests at the Sandy Hook proving ground. In the class of investigative tests on industrial materials work has been chiefly directed to concrete, plain and reinforced, in continuation of the comprehensive series of tests planned some years ago. Endurance tests of steel under repeated alternate stresses have been continued from former years. In tests of this class there is no display of ductility, all grades of metal behaving alike in the ultimate rupture of the steel without development of appreciable elongation or contraction of area. An increase in the appropriation for the testing laboratory is recommended, that a greater amount of investigative work may be performed. W. L. C.

The National Metal Trades Association at Boston.

The Boston Branch of the National Metal Trades Association is making preparations for the entertainment of the members on the occasion of its annual meeting, which will be held at Boston March 21 and 22. President Fred F. Stockwell has appointed a committee of 21 to look after the various details in connection with the meeting. The committee has organized with M. H. Barker, chairman, A. L. Lovejoy, treasurer, and D. F. S. Clark, secretary. It will constitute the Reception Committee. The following subcommittees have been chosen: Finance: A. E. Cox, chairman, Atlantic Works, Boston; A. L. Lovejoy, Becker-Brainard Milling Machine Company, Hyde Park; H. I. Illingworth, Boston Machine Works Company, Lynn; George F. Lawley, Geo. Lawley & Son Corporation, Boston; James G. Morrison, Mead-Morrison Mfg. Company, Cambridge. Hotel Accommodation and Banquet: Fred F. Stockwell, chairman, Barbour, Stockwell Company, Cambridge; Edwin E. Bartlett, Boston; Fred A. Fisher, Cape Ann Anchor Works, Gloucester; D. D. Russell, James Russell Boiler Works, Boston; Frank E. White, G. W. & F. Smith Iron Company, Boston. Printing: E. P. Robinson, chairman, Atlantic Works, Boston; Winslow Blanchard, Blanchard Machine Company, Cambridge; Thomas Hibbard, Geo. Lawley & Son Corporation, Boston; Eugene E. Childs, Trimont Mfg. Company, Roxbury; H. S. Corwin, Corwin Mfg. Company, Peabody. Entertainment: D. D. Russell, chairman, H. A. Stebbins Sub-Target Gun Company, Boston; Henry Lynch, Hodge Boiler Works, Boston; J. A. Murray, Murray & Tregurtha Company, Boston; J. E. Leavitt, Bresnahan Shoe Machinery Company, Lynn. The place of meeting is not yet ready for announcement.

At the annual meeting last week of the Association of Licensed Automobile Manufacturers the following officers were elected: President, Charles Clifton, George N. Pierce Company; vice-president, Thomas Henderson, Winton Motor Car Company; treasurer, H. H. Franklin, H. H. Franklin Mfg. Company; secretary, L. H. Kittredge Peerless Motor Car Company. The Executive Committee elected consists of F. L. Smith, Olds Motor Works; S. T. Davis, Jr., Locomobile Company of America; M. J. Budlong, Electric Vehicle Company; Wm. E. Metzger, Cadillac Motor Car Company; E. H. Cutler, Knox Automobile Company.

The Harbison-Walker Refractories Company, Pittsburgh, Pa., has taken over the selling organization of the Portsmouth Harbison-Walker Company and in the future all brands of brick, &c., made by the Portsmouth Harbison-Walker Company will be sold by the Harbison-Walker Refractories Company direct from its Pittsburgh offices.

The American File Sharpener.

An interesting process for restoring the cutting edges of worn out files has been patented by the American File Sharpener Company, 296 Broadway, New York. The resharpening is effected by submitting the file to the action of a jet of steam or air laden with abrasive material, in such a way as to expose the back and sloping faces of the teeth to the blast. Fig. 1 shows a sectional view of the machine indicating how the abrasive material is forced against the file at an angle of from 15 to 30 degrees, and also shows the inside siphons taking the material from the bottom of the machine and using it over and over again until it is gradually cut up and carried away by the overflow outlet. Fig. 2 shows a piece of a file in a worn out condition, and Fig. 3 the same file after being resharpened by one of these machines.

This device is claimed to bring the cutting edge of the file back to its normal condition, and to be a great saving to any factory, both in expense and in trouble with their employees, who insist on having new files frequently.

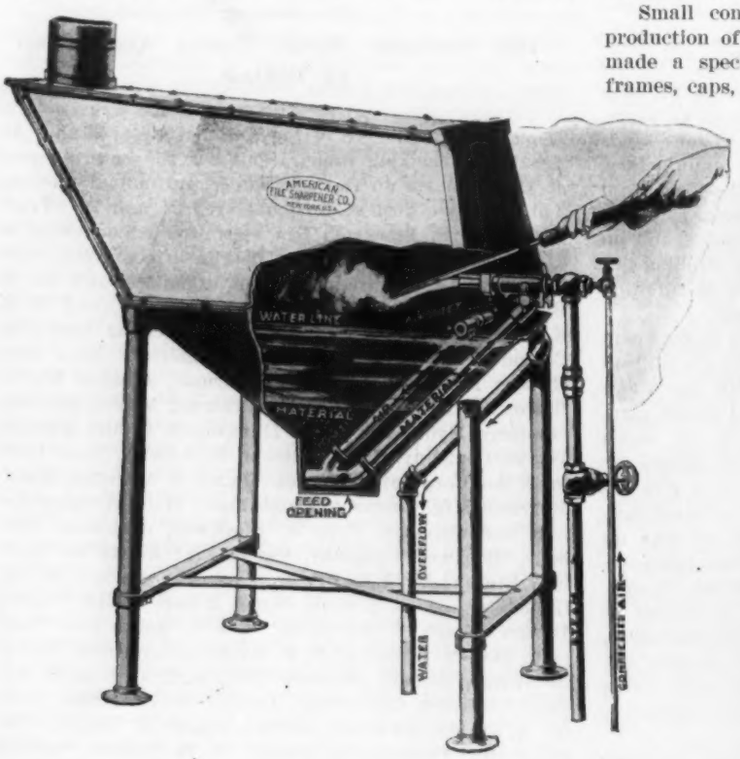


Fig. 1.—Apparatus for Restoring the Cutting Edges of Files, Made by the American File Sharpener Company, New York City.

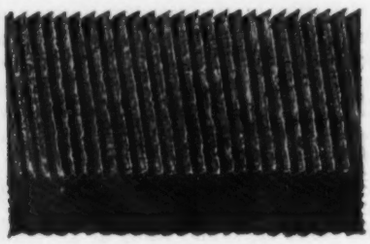


Fig. 2.—Section of a Wornout File.

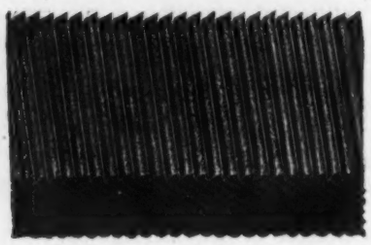


Fig. 3.—The Same File After Being Resharpened.

The manufacturer states that 90 per cent. of the files ordinarily considered to be worn out can be made as good as new in this machine at an expense of about one-tenth the original cost, and even goes so far as to say that the workmen prefer the resharpened ones because of the uniformity of the teeth after having gone through this machine. The teeth are smooth on top, whereas, in a new file, the cut is raised unevenly. One user testifies that he is able to get 75 per cent. as much work out of a file the first time it has been sharpened as when it was new. The files can be resharpened many times, according to the work on which they are used, for brass work from five to six times with good results, and on steel and castings from three to four times. A saving in file bills of from 50 to 75 per cent. yearly is said to be possible.

The abrasive, known as carboflynt, is an inexpensive material, and seems to have proved the most effective material for putting an edge on a dull file in the most economical manner. Sand is not used nor the sand blast process, nor any acid or chemical. The means for throwing the abrasive material against the teeth is either by steam or by a combination of steam and air. An inexperienced workman can easily learn to sharpen files on this machine, an expert mechanic not being required to operate it. Machine or hand-cut files, from the finest imported Swiss file to the coarse American horse rasp commonly used in this country, may be sharpened in this machine, and hack saw blades can also be sharpened with good results. From 200 to 300 files is given as the daily capacity, according to the size and condition in which they are received for sharpening. The file is delivered ready for service, and as it is not heated in the process the temper is not affected.

The Atha Steel Casting Company's Additions.

The Atha Steel Casting Company, Newark, N. J., has recently completed three 30-ton open hearth furnaces besides large additions to its foundry, and is now in a position to take care of a much greater tonnage in steel castings. The old foundry has practically been replaced by a modern plant of steel and concrete construction, and the company can now produce over 3000 tons of open hearth steel castings per month. Of course this can be increased to a considerable extent when necessary.

Small converters will continue to be used for the production of small castings. The company has always made a specialty of electrical steel, furnishing motor frames, caps, poles and armatures for many of the large electrical companies. It has also paid careful attention to railroad work, in which it turns out a large tonnage of cast steel body and truck bolsters. Within the last few years the company has developed a new motor gear for street railroad use which is made of a steel so hard that it cannot be machined with ordinary tool steel, but is ground to dimensions. Although this steel is very hard, yet it is so tough that test pieces can be bent cold through an angle of 180 degrees without showing fracture. While the company has had the reputation of furnishing the highest grade of steel castings produced, it states that it is having even better success with the new furnaces than with the old ones.

The Susquehanna Iron Products Company, which will succeed the Susquehanna Iron & Steel Company, has organized by the election of the following directors: James G. Lindsay, Henry Clay, Walter Penn Shipley and Charles A. Porter, Philadelphia; K. K. McLaren, New York; Horace Keesey, York, Pa., and Charles W. Bitner, Lancaster, Pa. James G. Lindsay will be president and William C. Martin secretary and treasurer. The reorganization plan has been approved by more than 82 per cent. of the old stockholders.

Ore Sales Have Been Heavy.

Most of Next Year's Product Under Contract.

DULUTH, MINN., November 10, 1906.—A great deal of ore has been sold, much more prior to the present movement than is generally admitted, and the bulk of the product for the coming year has been disposed of. As the significance of the reduction in standard has been fully pointed out and is well known there is no need of referring to it extensively here. It is simply admitting officially what has been pointed out time and again in this correspondence as to the change that has been made in conditions on the various ranges. Notwithstanding the diminution in standards there will doubtless be the same disposition to ship off grades and accept the consequent penalization that has been prevalent in late years, with the natural base 1.7 higher. The gain to miners does not lie so much in the reduction of standards as in the 75-cent addition to price, and it should make mining profits very good and maintain the advanced rates of royalties that have been demanded recently. Some of the large merchant ore firms are unwilling to sell to capacity, even at the advance offered, but are conserving a considerable share of their possible 1907 production for sale next spring and summer, when they look for a further advance on account of the scarcity of ore and the demands of belated buyers, providing iron market conditions remain as strong as now.

Forecasting Next Season's Production.

Already guesses of 40,000,000 tons for the coming year are in evidence. These are probably based more or less on the expectation that the Oliver Iron Mining Company will mine very heavily on the Hill tracts, recently secured, as well as on the belief that the new western Mesaba districts around Coleraine and Holman will be the heavy producers anticipated. Neither is probable. Unless unexpectedly rapid work is done elsewhere along the Hill lands the bulk of the 1907 production therefrom will be out of the Leonard mine, which is a milling property with a comparatively small and very deep pit. It will be difficult to enlarge the Leonard pit so as to make mining a large tonnage easy there next year, and it has not been the custom of the Oliver Company to push any mine beyond an economical production. It is true that the company is arranging for a new operation in 56-23, and will be able to take a large amount of Hill ore from that township, but it can hardly do anything of consequence there in 1907. As to operations around Coleraine, the first unit of the experimental washing plant is not yet in readiness for operation and the company will be handicapped in the matter of large output there, not only till this experimental plant is completed, perhaps modified, and proved successful, but till additional units shall have been erected. A larger share of this western ore can be shipped unwashed than was formerly believed practicable, both from the improvement that further developments have made in the character of ore shown and from the drop in merchantable requirements, but it will be generally necessary to have washing plants in readiness before any great bulk of the better ore can be economically mined.

It is safe to say that the old ranges will make no material increase in 1907; indeed, many Mesaba districts can scarcely add much to present product without undue expense.

A stripping operation of considerable magnitude is under consideration by the Oliver Company for the vicinity of Eveleth. It has been testing the west half of section 36-58-18, known as the Leonidas and held under State contract, and expects to strip that as well as a 40-acre tract a mile away to the east. A considerable addition will be made to the present stripped area of the Adams, which lies between these two properties. Several million yards will be moved.

The Cuyuna Range Not Yet Shipping.

There is still about the same activity in drilling on the Cuyuna, or Deerwood, range as has been noted for many months. It is three or four years since Cuyler Adams of Duluth first undertook operations there, but as yet no mine is opened and no large tonnage has been found that is conceded to be good enough to ship. No railroad has yet offered such freight rates as will permit the movement of this ore, even if it could be sold, and no owner seems to be making arrangements that even suggest the possibility of an early development of the district. Still, it is quite possible that, if shipping conditions were more favorable, ores have been found in some quantity which, though not freely salable, might be shipped to furnaces owned in connection with the mining company. The original Adams Company and other concerns in which Mr. Adams is a stockholder are said to have leased some 1000 acres of land to various interests, on which low annual royalties are being paid, but on none of them are arrangements for mining contemplated.

The deal of the New York State Steel Company for the purchase of the lease of the northwest of the northeast of section 9-58-16 has been closed, and Superintendent Kendall of the company is now buying material and machinery preparatory to opening a mine there. This will be called the Kellogg, in honor of the president of the steel company, and will be a considerable shipper next year. This deal has received considerable attention on account of the fact that it is for the highest royalty ever paid in the Northwest—$1 per ton. There has been found on the land to this time about 2,500,000 tons of merchantable ore, averaging about 61 per cent. iron and low in phosphorus, and the tract is by no means fully explored, so that the fortunate fee owners are liable to receive $3,000,000 or $4,000,000 for their ore in the ground. The mine will be underground and is not supposed to have very much water or quicksand. The same company is now exploring in 56-23, in a locality that presents excellent possibilities, but where the royalties are very much lower.

In the vicinity of the new Kellogg there has been a great deal of difficulty with quicksand. Pickands, Mather & Co. have suffered especially from this, as they have been sinking at several points along Embarras Lake, where this trouble seems most acute. At this firm's Bangor and Syracuse mines shaft sinking has been abandoned several times, and is now under charge of the Foundation Company of New York, which is making preparations for pushing the work as soon as its preliminary operations have been completed. Other mines to be opened in the same immediate neighborhood will perhaps have similar difficulty, which is accentuated by the fact that the surface, in addition to its quicksands, carries an unusual number of large granite boulders, the ground having been at one time the bed of a large stream.

The Penn Company Makes an Important Strike.

An important strike has been made by the Penn Iron Mining Company (Cambria Steel Company) at its East Vulcan mine, Norway, Mich. A tunnel has cut a body of excellent ore which is so far proved to be 45 ft. in width, with the foot not reached. This company has many improvements under way, among which are a shaft and the water power development of Sturgeon Falls.

D. T. Morgan, who has been manager of the Republic mine, Republic, Mich., for a number of years, has resigned and will cease active labors. For the past two years this mine has been a property of the Penn Company.

The Verona Mining Company (Pickands, Mather & Co.) is cleaning up all stock piles at its Menominee range mines. Indeed, the Baltic and Caspian have been cleaned out, and the Vivian is going forward rapidly. The firm has seven diamond drills under contract in the Stambaugh section now, and will install electric haulage at several of its mines the coming winter.

For the past week weather conditions have been excellent and shipments of iron ore have been heavy from nearly all points. A few mines on every range are through for the season and have begun stocking ore again, but the larger shippers are pushing forward and will so continue till the winter is upon them. November shipments will be large, and if there is little frost till the close of the month totals for the year will be somewhat in excess of the figures heretofore given by conservative estimators.

D. E. W.

Foundry Mixtures.*

Effects of Various Impurities on Pig Iron.

BY DR. BRADLEY STOUGHTON.

The two important points of difference between iron castings and steel castings are: 1, That the former have about 3 to 4 per cent. of carbon, while the latter have usually less than 1 per cent., and 2, that the cast iron has about 10 times as much silicon as the steel. The advantages of cast iron, and the reason it is so extensively used are its fluidity, low shrinkage, relative freedom from checks and the ease with which we can at will confer different properties upon it. The advantages of steel are its strength and its ductility.

The amount of combined carbon in the cast iron and in the steel varies between practically the same limits, but cast iron contains, in addition, 2.5 to 3 per cent. of graphite, and 1 to 2 per cent. or so of silicon. From this standpoint cast iron may be considered as high silicon steel mechanically mixed with crystals of graphite, and

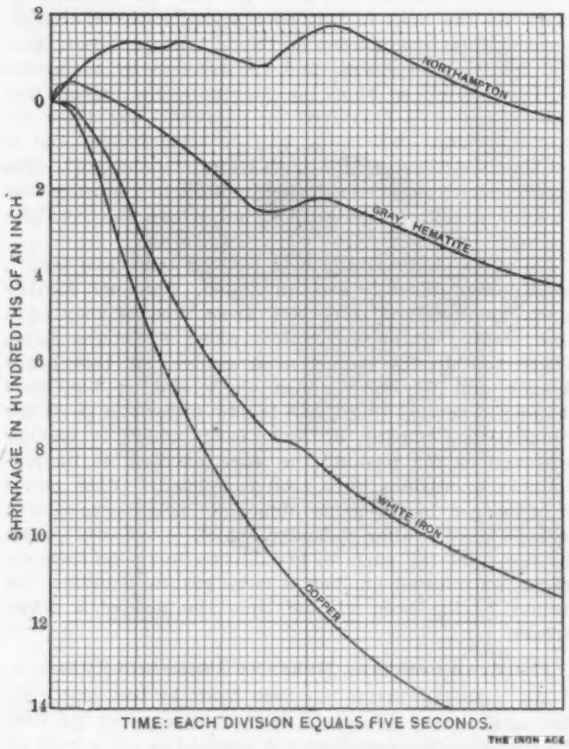


Fig. 1.—Preliminary Expansion in Shrinkage of Cast Iron.

many of its properties are logically explained upon this basis.

Shrinkage.

One of the most striking illustrations of this principle is in the shrinkage of iron castings, which averages about one-half that of steel. The difference is due to the expansion caused by the graphite, which separates out of the iron and pushes aside the particles of metal, during and immediately after solidification. After this the metal contracts like steel, but the preliminary expansion has been such that the ultimate shrinkage is only about one-half what it otherwise would have been. We can thus control this shrinkage by controlling the amount of the expansion, through varying the graphite. This point will be more readily understood by referring to Fig. 1, which is taken from a recent article by Prof. Thomas Turner of England. †

Explanation of Fig. 1.

The point O marks the position occupied by the end of the bars at the moment of solidification. It will be seen that in the case of copper the metal contracts continuously from this point, as shown by the continuous drop of the curve. In the case of white iron the metal contracts continuously until we reach a certain point (which is at a temperature of about 665 degrees C.) when

Fig. 2.—White Cast Iron.—Magnification, 50 Diameters; Silicon, 0.75 Per Cent.; Sulphur, 0.120 Per Cent.

a momentary arrest of the shrinkage takes place, after which the metal again contracts. This arrest is common to all cast iron and steel and is not related to graphite. Now, see what a difference there is in the case of gray hematite cast iron, which does not shrink immediately after freezing, but expands very appreciably, as shown by the rise in the curve. This expansion is due to the graphite that is being expelled from the metal and occupies space between the particles of iron.

Again, in the case of the Northampton iron, which is high in both silicon and phosphorus, the expansion is very long continued, and the metal cools to a temperature of almost a black heat before the bar has shrunk again to the size it had when first cast. This expansion is again due to the separation of carbon, and is assisted, apparently, by the phosphorus keeping the iron in a semifluid condition for a long time and thus allowing the graphite more easily to separate and make place for itself. Here, too, we have an explanation why phosphoriferous irons fill every crevice of the molds so perfectly. Being in a pasty condition for some time, and continually expanding,

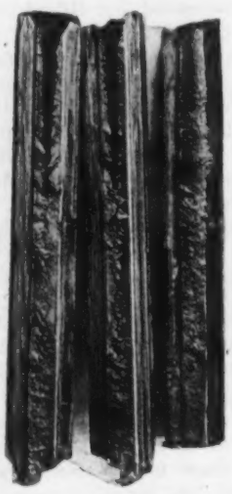


Fig. 3.—Contraction Cavity or "Pipe" in Steel Castings.

the semifluid metal is forced into the tiniest crevices of the molds, filling all the corners with astonishing sharpness.

These explanations show why the shrinkage of the

* Paper read before the Pittsburgh Foundrymen's Association, November 5, 1906.

† Journal of the Iron and Steel Institute, No. 1, 1906.

casting increases with the amount of the sulphur and the speed of the cooling (which reduce graphite), and decreases with the amount of silicon, which increases graphite.

Porosity.

The maximum density of cast iron occurs with 1 per cent. of silicon. With more than that too much graphite

Fig. 4.—Gray Cast Iron.—Magnification, 50 Diameters; Silicon, 1.75 Per Cent.; Sulphur, 0.025 Per Cent.

separates, causing the crystals of the metal to be large and separated from each other by flakes of graphite, so that the grain is open, and water, under heavy pressure, might leak out (for example, in the case of hydraulic cylinders, &c.). Above 2 per cent. of silicon the grain of the iron becomes so open as to be actually porous, and the density falls off 12 per cent. With less than 1 per cent. of silicon, Fig. 2, the cast iron will contain spongy spots or blowholes. These spongy spots are due to high shrinkage on account of low graphite. In the case of steel, where there is no graphite, these spongy spots actually become large open cavities, or "pipes" (see Fig. 3).

To make a close grained iron for hydraulic work the sulphur should be from 0.03 to 0.055 per cent., Fig. 4. If more than this the iron is liable to be dirty, to contain spongy spots on account of low graphite, to be difficult to machine on account of high combined carbon, and to

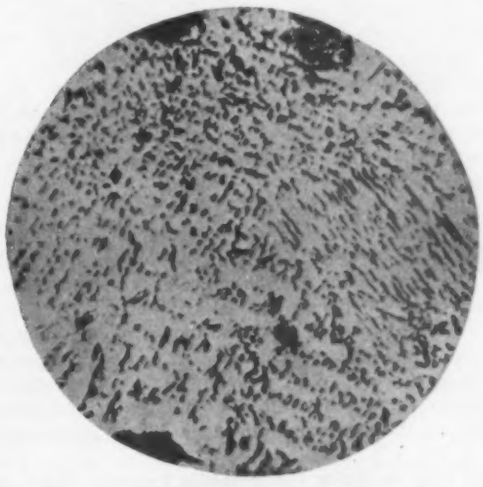


Fig. 5.—Phosphorus Eutectic in Cast Iron.—Magnification, 1,000 Diameters.

be weak because sulphur, aside from its effect on carbon, greatly reduces the strength of iron as well as steel. Especially, if the phosphorus is high, the sulphur must be kept down to these limits or the iron will be hard and brittle, because phosphorus and sulphur working against each other, one increasing and the other decreasing shrinkage, make brittle iron.

Cast iron for the same use should contain from 0.4 to 0.6 per cent. of manganese. We do not want more manganese than this or the casting will be difficult to machine. We do not want less than I have indicated, because manganese assists greatly in counteracting the bad effects of sulphur and phosphorus.

Phosphorus has a double acting influence on the porosity of cast iron: 1, It increases the size of the crystals, decreases shrinkage and causes a large expansion after solidification, as explained in connection with Fig. 1; but, 2, it fills all the crevices between the crystals and in the interior of the iron, which, by decreasing the porosity, counteracts its first influence. When the phosphorus is high the phosphorus and iron form a combination known as a eutectic, Fig. 5, which remains fluid for a long time and fills the tiniest crevices in the interior of the metal. For this reason iron for hydraulic work may run up to 0.7 per cent. phosphorus, but above that the iron is liable to be weak and "cold-short," especially under impact. In fact, where very strong iron is desired the phosphorus should be kept down to 0.4 per cent. at least.

With the various amounts of impurities mentioned above the combined carbon will be in the neighborhood of 1 per cent. and the graphite about 2.5 per cent., the exact amounts depending upon the thickness of the castings and the rate at which they are cooled. If we desire

Fig. 6.—Crystals of the Double Carbide of Manganese and Iron $(Fe, Mn)_3C$.—Magnification, 50 Diameters.

to keep the combined carbon the same and reduce the graphite it will be necessary to reduce the total carbon. This can be accomplished by mixing in steel scrap and melting fast in the cupola, or by melting in an air furnace instead of a cupola. This reduction in graphite results in a closing of the grain of the steel, with consequent increase in strength and density.

Segregation.

A common cause of porosity in castings is segregation, or collection together of impurities in spots. This segregation is the greater the greater the amounts of phosphorus, sulphur, manganese and silicon. Phosphorus increases the segregation by making a fluid eutectic, which does not solidify until after the remainder of the casting, but then runs into that part of the metal having the loosest texture. This part is usually in the middle of the larger sections of the casting and when the silicon is high and there are shrinkage spots the segregation will be excessive in the neighborhood of these spots. Manganese and sulphur are also liable to collect in the same way and place. These localities, where the segregation is high, known, when very bad, as "hot spots," are sometimes porous or surrounded by porous parts of the casting. They are sometimes so extremely hard that no tool will cut them. One way of getting rid of them is to use very large risers, or headers, which solidify last and serve as feeders for the remainder of the metal. Under these circumstances the segregation occurs in the riser,

and is thus temporarily removed. This method is not advisable as a regular practice, however, because these risers ultimately find their way back into the cupola as scrap and result in increasing the impurities in a subsequent set of castings.

Headers themselves increase the density of iron cast-

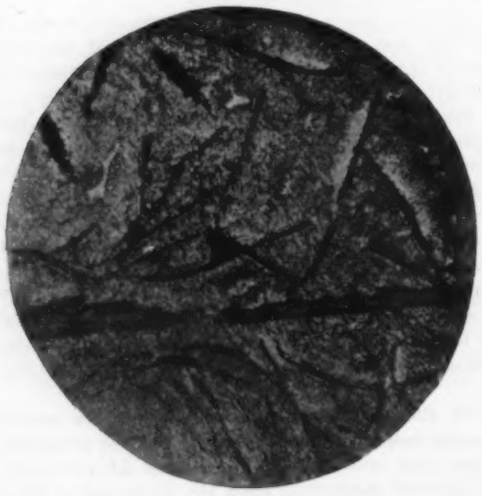


Fig. 7.—Gray Cast Iron Cooled Extremely Slowly, Showing the Very Large Size of Graphite Crystals.—Magnification, 50 Diameters.

ings by feeding the metal and so preventing the porous spots, and also by keeping the metal under a pressure during solidification. This latter is especially serviceable when the phosphorus is high, which tends to make the metal expand during solidification, as I have shown.

Softness, Workability and Strength.

It is the combined carbon which is the great hardener of cast iron, the other elements producing hardness chiefly in proportion as they produce combined carbon, except manganese, which not only produces combined carbon, but also produces a compound, Fig. 6, having the formula, $(FeMn)_3C$, which is very hard and difficult to machine.

Silicon, by decreasing combined carbon, decreases hardness. When we get above 3 per cent. silicon, however, there begin to form new compounds with silicon which make the iron hard. Furthermore, silicon above 3 per cent. increases combined carbon, instead of decreasing it.

The maximum softness of cast iron is obtained with about 2.5 to 3 per cent. of silicon, the sulphur being not above 0.1 per cent. and the manganese not above 0.4 per cent. In large or slowly cooled castings, Fig. 7, the silicon should be near the lower limit, and in small or rapidly cooled castings near the upper limit, in order that the combined carbon may be down below 0.15 per cent. and the graphite more than 3 per cent. Such a cast iron would correspond to a soft steel, Fig. 8, mechanically mixed with crystals of graphite. This soft steel would machine with great ease, and the graphite would act as a lubricant for the cutting tool. The mixture will have a transverse strength of about 2000 to 2200 lb., be low in density and open in grain. To increase the strength without increasing the hardness the best way is to cut the sulphur and phosphorus down to a low point, if possible, because sulphur, and next to it phosphorus, are the impurities which weaken iron most (aside from their influence on carbon). Another way is to decrease the total carbon, and hence the graphite, because graphite crystals, especially if large, are great weakeners of cast iron.

The strength of steel, Fig. 9, is more than double the strength of cast iron, the difference being due altogether to the graphite in cast iron, because silicon in itself (aside from its influence on the carbon) is a strengthener of both iron and steel up to at least 4 per cent. The way in which the graphite destroys the strength is well known to all, the broad plates of the metalloid forming planes of weakness in the casting, which easily break asunder, the graphite splitting in two, just as flakes of mica break apart, leaving one-half of each crystal of graphite sticking to each side of the fracture. This action can be proven by any one to his satisfaction by taking a fracture of open gray iron and brushing one side of it for several minutes with a stiff brush. In this way the half plates of graphite will be brushed off, leaving a surface underneath almost of the color of white iron.

The total carbon may be reduced by melting steel scrap with the iron, or, to a slight extent, by decreasing the amount of manganese, provided that the manganese left must always be at least twice the sulphur, or the iron will be weak and brittle.

Effect of Increasing Combined Carbon.

The strength of cast iron may be increased by increasing the combined carbon, but this is done at the expense of softness and workability. Cast iron containing from 1.5 to 2 per cent. of silicon (depending upon the size of the castings and rate of cooling), 0.9 per cent. of combined carbon, 0.5 per cent. of manganese and not more than 0.08 per cent. of sulphur and 0.3 per cent. of phos-

Fig. 8.—Low Carbon Steel, Consisting of Crystals of Pearlite Surrounded by Carbonless Iron.—This Material Is Easy to Machine.—Magnification, 250 Diameters.

phorus, will work without difficulty in the machine shop and have a tensile strength of over 28,000 lb. per square inch. In many cases foundries are unwilling to go to the expense of such a low sulphur and phosphorus. In this case the strength must be obtained by raising the manganese, which is not advisable, as it decreases the softness more than any other element, causes dull iron and high total carbon.

An important point in connection with the strength of cast iron is the size of the crystals of graphite—the smaller these crystals are the greater the strength, because the smaller are the planes of easy rupture. A notable example of this is malleable cast iron, which may have a tensile strength of 45,000 lb. per square inch, even when the percentage of graphitic or temper carbon is as high as 3 per cent. The very small size of the flakes of the temper carbon, Fig. 10, does not reduce the strength as much as the same amount of the larger graphite crystals.

One way to make the graphite crystals small is by mixing different brands of iron in the cupola. Why this should produce smaller crystals than when only one brand is melted is unknown to me, but does not change the fact, which explains why it is considered advantageous to mix brands for foundry work.

To obtain high transverse strength the silicon should be about 0.2 per cent. lower and the combined carbon about 0.2 per cent. higher than the figures given for tensile strength. Otherwise the effects are very similar.

Sulphur and Manganese.

Sulphur and manganese both increase combined carbon. It is important to note, however, that sulphur and manganese form a compound with each other having the formula MnS, and to this extent they neutralize each other and neither has so great an effect on the carbon. To form the compound mentioned about 2 parts of manganese unite with 1 part of sulphur. If, therefore, we have just twice as much manganese as sulphur in our castings these two elements are all used up in neutralizing each other and neither of them acts so powerfully upon the carbon. It is only the excess of one or the other over the amount necessary to form the MnS which has the full effect.

The compound, MnS, is of great importance in foundry metallurgy, and explains many things that have troubled foundrymen for some time. If there is more sulphur than one-half of the manganese the excess goes to form a sulphide of iron, and this sulphide of iron is very harmful in castings, greatly reducing strength and producing checks, as well as "red-shortness" and "cold-shortness." It is, therefore, of great importance that there should be at least twice as much manganese as sulphur. The sulphide of manganese is itself bad for castings, but the sulphide of iron is very much worse. In this connection it is important to notice that iron takes up about 0.35 per cent. of sulphur in the cupola and loses about 0.1 per cent. of manganese, or more if the manganese is obtained by melting spiegeleisen or ferromanganese with the iron, so these allowances must be made in calculating the foundry mixtures.

Checking.

The time when a casting usually checks is when it is just above black heat. It is then in a weak condition, and, as shown by Fig. 1, is crushing the sand severely.

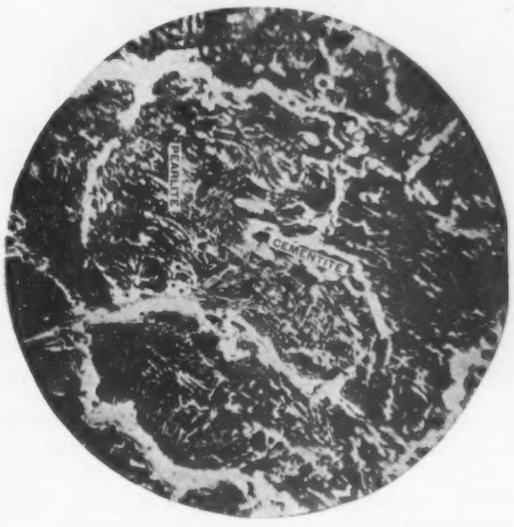


Fig. 9.—High Carbon Steel Containing Pearlite Surrounded by Crystals of Hard, Brittle Cementite (Fe_3C).—Magnification, 50 Diameters.—The Cementite Makes this Steel Difficult to Machine.

Sulphur greatly increases weakness at this temperature, because both sulphide of manganese and sulphide of iron are now in a pasty condition, and therefore offer very little resistance to breaking. The sulphide of iron is much worse, however, because this is spread out in thin plates or membranes which offer much more extended planes of weakness than the sulphide of manganese, which is in small spots or bubbles, resembling blowholes in its effect.

Phosphorus by decreasing shrinkage decreases the liability of checking, but phosphorus has another influence and that is the production of large sized crystals, and in this respect it increases the liability of the metal to check. An excess of manganese over twice the sulphur will, however, neutralize to a certain extent the influence of phosphorus in producing large sized crystals and will thus reduce checking.

The reason why checking is so liable to take place at the sharp corners is shown by Fig. 11, which is an exaggerated case of large sized crystals, but shows how these

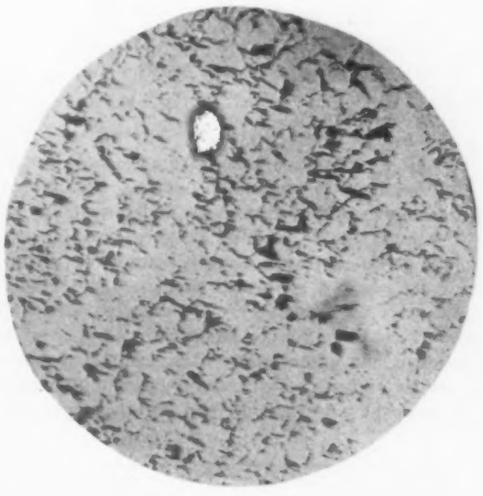


Fig. 10.—Malleable Cast Iron, Showing the Small Size of the Graphite Crystals.—Magnification, 50 Diameters.

crystals join together at corners and make a junction line of weakness along which rupture may easily take place. The size of the crystals can be decreased to some extent by chilling the sharp corners and by feeding them well. Feeding all localities liable to check has the double advantage of preventing shrinkage and segregation, both of which increase the liability of checking.

Comparison of a Good and a Bad Wheel.

An interesting practical test of these explanations of the properties of cast iron was given by Asa W. Whitney in the comparison of the two wheels having the composition shown below in Table I.*

Table I.

Good wheel required 150 blows of 25-lb. sledge to break it. Poor wheel required 8 blows of 25-lb. sledge to break it.

	Fe.	Total carbon.	Si.	Mn.	P.	S.	Graphite.	C. C.
Good wheel....	94.79	3.84	0.69	0.13	0.43	0.12	3.30	0.54
Poor wheel.....	95.0	3.52	0.65	0.12	0.52	0.19	2.35	1.17

It will be seen that the analysis of the poor wheel does not differ enough from that of the good wheel to explain the cause of its weakness nor of the high combined carbon. Mr. Whitney figured out the chemical compounds

Fig. 11.—Large Crystals in Steel, Showing Weakness on the Corners Due to the Junction Lines.—Three-quarters Natural Size.

present, as given in Table II, and this shows at a glance the cause of the trouble. Notice the large amount of sulphide of iron in the bad wheel, and that instead of soft ferrite we have the hard embrittling cementite:

* Transactions of the American Society for Testing Materials. Vol. II, 1902.

Table II.

	Good wheel. Per cent.	Bad wheel. Per cent.
MnS	0.206	0.195
FeS	0.121	0.315
FeSi	2.045	1.923
Fe_3P	2.755	3.335
Pearlite	67.610	84.492
Ferrite	23.963	0.000
Cementite	0.000	7.390
Graphite	3.300	2.350
Totals	100.000	100.000

Value of Shrinkage Tests.

It is well known to all foundrymen that the metallurgy of cast iron is unusually baffling because of the double and contradictory influence which so many of the impurities have, and to which I have referred above. To obtain in a given casting a certain amount of chill, or of combined carbon and graphitic carbon, or of shrinkage, &c., under varying conditions of impurities, size of casting, rate of cooling, &c., is most confusing. Casting a shrinkage test bar undoubtedly aids greatly in determining the relative effects of all the varying conditions. Professor Turner has devised a very simple apparatus for making a shrinkage test which will not only measure the ultimate shrinkage of the iron, but will also show the different expansions, such as given in Fig. 1.*

This test will show at a glance not only the shrinkage of the iron but also give some indication of its liability to check, its strength, hardness, combined carbon, graphite and chilling properties, and is thus much more useful as a practical test than several laboratory tests.

The Pennsylvania Railroad will build at Altoona 25 freight engines which will be the largest and heaviest locomotives it has ever constructed or utilized for its regular freight service. The new engines, which will be experimental for the time, will be known as the H8 consolidation type. They will have a heating surface of 3850 sq. ft.; cylinders, 24 x 28 in.; the diameter of their driving wheels will be 62 in., or 6 in. more than the present standard; they will have a tractive power of 43,000 lb. and will weigh, in working order, about 225,000 lb. These engines are a resultant of the tremendous demand for cars and the growing tendency toward moving freight with greater and greater rapidity. They are constructed with a view to increasing the speed at which the heavy freight trains may move.

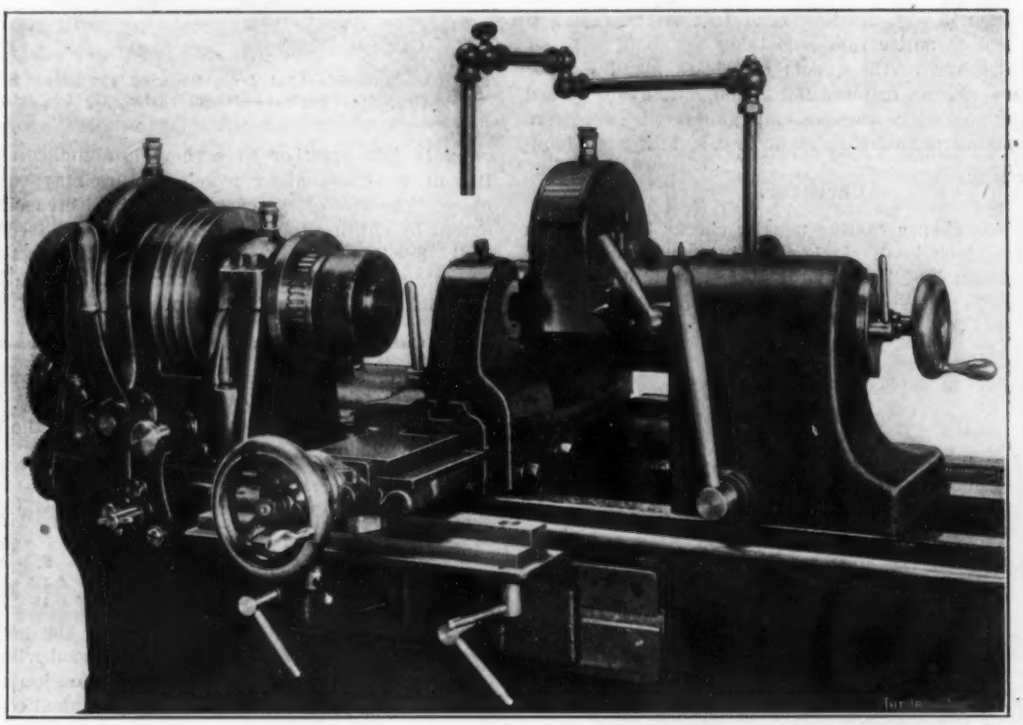
* This apparatus is described in the Journal of the Iron and Steel Institute. No. 1, 1906.

The P. & W. Taper Threading Attachment.

The attachment illustrated is substantially the same in principles of construction and operation as the familiar taper turning attachment used on engine lathes. It is made by the Pratt & Whitney Company, Hartford, Conn., and may be applied to the company's 6 x 48 in. thread milling machine when being built.

The taper bar is made in two parts, the one nearest the headstock being secured in position parallel to the working centers, and the other is made adjustable to suit the required taper. This permits the threading of pieces which have both a taper and a straight portion. The bracket upon which the taper bar is mounted is attached to the front side of the bed with provision for longitudinal adjustment to suit the location of the taper on the pieces to be milled.

The cutter head is arranged on a transverse slide, to which is also attached the cross slide screw with its micrometer disk and positive stop, thus providing means for adjustment, for diameter of work and depth of cut, independently of the motion which produces the taper. This later motion is communicated to the slide through the medium of a positive shoe attached to the slide and in contact with the front side of the taper bar, and a roll under adjustable spring pressure on the rear side.



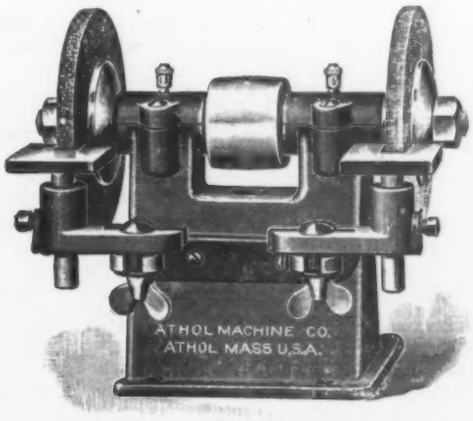
Taper Threading Attachment as Applied to the 6 x 48 In. Thread Milling Machine Built by the Pratt & Whitney Company, Hartford, Conn.

The greatest angle to which the taper bar may be adjusted is 10 degrees, which corresponds to a taper of about 4 in. to the foot on the work. All adjustments of the bar and the bracket may be made without the use of a wrench.

At the meeting of the German Steel Syndicate on October 26 prices for steel billets were advanced 5 marks per ton and sales books for the second quarter of 1907 were thrown open. The export allowance for the second quarter of 1907 was fixed at 2.50 marks. It was decided to open order books for the first quarter of 1907 on structural shapes at an advance of 5 marks per ton. The allotment on forgings was increased by 10 per cent., but proposals to increase the allotment on bars and wire rods were postponed.

The Athol Bench Grinder.

A neat, rigid and compact bench grinder, made by the Athol Machine Company, Athol, Mass., is illustrated herewith. It occupies a very small space, 5 x 9⅝ in. over all, and standing 7 in. high. Its weight is 13 lb., equipped as shown with adjustable rests. This part of the grinder is removable when it is desirable to dispense with the rests. It is, however, convenient when grinding a number of light pieces, and may be quickly detached when not needed The particular serviceableness of the grinder is for grinding drills, reamers, counterbores, and all the numerous small tools which are used in the ordinary shop, as well as for rough grinding small machine parts, castings, forgings, &c. The wheels are 8 in. in diameter, and are mounted on a ½-in. spindle, which is ¾ in. in diameter in the bearings. The bearings are equipped with patent oil cups. The grinder is a handy piece of machinery, which may be located on a bench in any nook or corner of the factory, and is very useful for grinding such work



The No. 159 Bench Grinder Made by the Athol Machine Company, Athol, Mass.

as has been mentioned. It is furnished in either of two ways—that is, with or without the rests. Without them the grinder weighs only 10 lb.

A Lubricating Emulsion for Cutting and Threading.

J. W. Foster, 1230 East North avenue, Baltimore, Md., is putting on the market a lubricating emulsion for pipe and bolt cutting and threading, drilling, punching, press work, milling, &c. First made in January, 1905, Mr. Foster has had it in practical use since then. Using a cutting oil composed of two-fifths cottonseed oil and three-fifths dark neutral oil, the output per machine on pipe sizes on a double head machine on ½-in. nipples from 2 to 6 in. in length averaged 1900 finished pieces; on ¾ in. of the same length, 1800 finished pieces; on 1 in., 1350 pieces; 1¼ in., 1050 pieces; 1½ in., 975 to 1000 pieces, and 2 in., 675 pieces. With this new emulsion the same machine produces 2450 pieces of ⅜-in. nipples, 2400 of ½-in., 2300 of ¾-in., 1800 of 1-in., 1300 of 1¼-in., 1250 of 1½-in. and 850 finished pieces of 2-in., threaded at each end.

During 1904 the cost of oil at the plant was 0.3593 cent per 100 finished pieces, using over the oil from the turnings without charge. In 1905 the cost of the Foster emulsion on 2,407,321 finished pieces was $687.25, or 0.2854 cent per 100 finished pieces. The output to September 30, 1906, was 2,356,115 pieces, at a total cost of $554.20, or 0.2201 cent per 100 pieces.

The emulsion contains no acids, lyes, ammonia, ether, cottonseed oil, Turkey red oil, rosin, or soda, and is reduced by water to the consistency desired for bolt threading and cutting, milling, tapping and drilling, for which it has been tested.

A financial writer calls attention to the fact that a peculiarity of existing financial conditions is that not since 1890 have the business interests of the United States and Europe had simultaneous need for all their own capital and considerably more.

Customs Decisions and Affairs.

Steel Wire Duty.

It was decided by the Board of United States General Appraisers November 9 that headless iron or steel shafts intended for use in the manufacture of hat or bonnet pins are more specifically provided for in paragraph 137 of the tariff act, under which they are dutiable, according to the gauge and cost per pound, than under paragraphs 188 or 193, as claimed by the importers, G. Hirsch's Sons, New York. The customs authorities returned the shafts for duty at the rate of ¼ cent per pound and 40 per cent. ad valorem, as being round iron or steel wire not smaller than No. 13, wire gauge valued at more than 4 cents per pound. It was maintained by the importers that the shafts should be admitted as "pins," with duty at the rate of 35 per cent., or else as manufactures of metal at 45 per cent. Other claims were also made by the firm for lower duty, but all of the contentions are overruled.

Electrollers.

The General Board of Appraisers announced a decision November 10 dealing with the subject of the classification of electrollers imported by T. M. James & Sons, Kansas City, Mo. The merchandise is composed of metal and glass, and in the view of the customs officials it was held dutiable at 60 per cent. under the provision for glass not specially provided for. When the case came before the board, however, evidence was presented showing that the component material of chief value in the goods is metal and not glass. This contention is upheld by the tribunal, and the collector is directed to reliquidate the entries on the basis of 45 per cent.

A Proposed Importers' Organization.

Notwithstanding previous failures, another attempt is to be made to organize the importers of the country, especially those of New York, into an association for mutual benefit and protection. While the promoters of the latest plan for an association of importing interests are not ready to make a formal announcement, the general outline has been learned. If the project is put into operation the association will further the interests of importers on lines identical with those pursued by the American Protective Tariff League in behalf of domestic manufacturers and producers, excepting that the importers' association will not participate in politics.

It is maintained by those favoring organization that the necessity for some kind of concerted movement by importers for the conservation of their interests is imperative, and that the present is opportune for such action. If the association is launched permanent offices in New York will be engaged and placed in charge of a competent man who will have a staff of assistants. Complete information will be furnished importers and customs officials regarding foreign market prices in cases where controversies arise at the custom house, while anothanother feature of the association work will be a bureau for the receipt and investigation of complaints dealing with the under-valuation of foreign merchandise, alleged persecution by Government officers and fraudulent transactions by importers.

The promoters of an association point out that importers lose thousands of dollars annually through extra duties and penalties inflicted by the customs authorities, delays at the custom house and the accompanying cancellations of orders. It is believed that with a strong organization in the field many of the losses and annoyances now encountered may be eliminated. In view of past failures to organize importers into a compact body, it is probable that the situation will be carefully canvassed to ascertain the precise degree of interest felt by merchants in the proposition, and furthermore, to what extent financial aid may be expected. The last organization of importers was known as the National Association of Importers, but after a precarious existence of about a year it disbanded in 1904.

The Bristol Mechanical Time Recorder.

An instrument, Fig. 1, to make a graphic record of variations of mechanical movements and the time of such variations, has been placed on the market by the Bristol Company, Waterbury, Conn. It has been given the name Mechanical Time Recorder, but should not be confused with a time clock. Among the uses to which the instrument may be put are the recording of the rate of motion and position of sluice gates, turbine or engine governors, gate valves, &c. It is also adapted for recording the rise and fall of liquids in tanks, rivers, reservoirs and fore bays. In the gas industry it can be used to check up the operators and thus prevent the "blowing" of the holders either day or night. Its applications are, however, so many and varied that it is difficult to mention them even for a single industry.

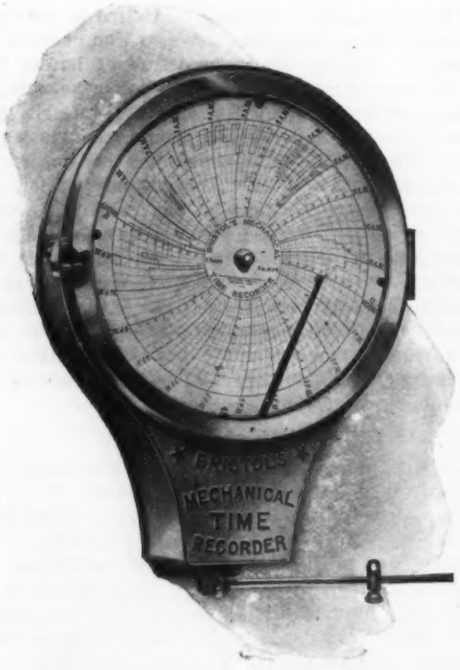


Fig. 1.—An Instrument for Recording the Time and Extent of Mechanical Movements, Made by the Bristol Company, Waterbury, Conn.

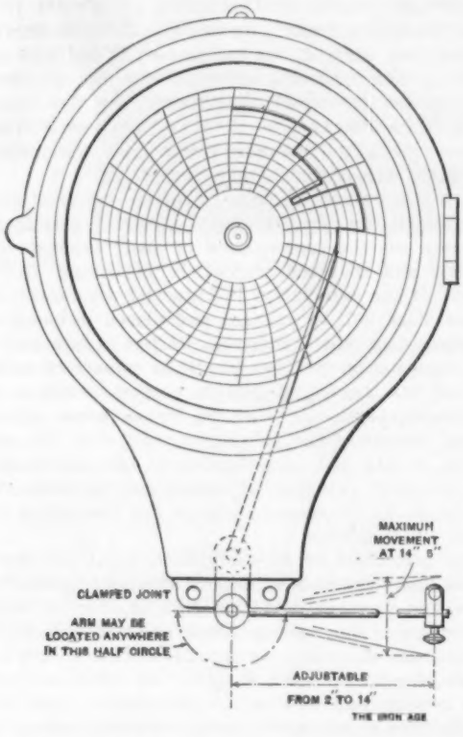


Fig. 2.—Diagram of the Mechanism of the Bristol Mechanical Time Recorder.

The record is made on a circular chart, which is revolved by clock work at uniform speed, while the pen moves over the chart an amount proportional to the motion to be recorded. The chart is 8 in. in diameter, being the same size as the standard Bristol gauges. Clock movements can be supplied for a complete revolution of chart once in 15 minutes, 1, 2, 3, 4, 6, 8, 10, 12, or 24 hours or seven days. Thus it may be seen that the speed may be selected to give best results under all commercial requirements.

From Fig. 2, which shows the mechanism, it will be seen that the pen arm is rigidly attached at its lower end to a shaft which is turned by a short arm projecting through a slot in the bottom of the case. The lever, projecting to the right, is clamped to the short arm by a thumb nut. Special attention is called to the fact that this lever is adjustable and can be clamped to the arm at any convenient angle. The motion to be recorded after being properly reduced, if necessary, is imparted to the lever which in turn transmits it to the pen.

The total scale on the chart is usually taken proportional to the total motion to be recorded. Reduced motion, if necessary, can easily be arranged by the aid of pulleys, levers, or other reducing devices. Fine adjustments can easily be made by applying the motion at the proper point along the lever, and to facilitate this, a metal attaching piece is provided, which is adjustable on the lever arm and secured in position by a thumb nut. With the adjustable lever arm and the adjustable slide on the arm the instrument is conveniently adapted to record motions of all amounts and directions. The total deflection of the pen is obtained when the lever is turned through an angle of about 21 degrees, or a 5 in. arc measured at its outer end.

The Philadelphia Foundrymen's Association.

The 161st regular meeting of the Philadelphia Foundrymen's Association was held at the Manufacturers' Club in that city Wednesday evening, November 7. President Devlin called the meeting to order at the usual hour. Dr. Elmer E. Brown, chairman of the General Entertainment Committee, appointed by President Devlin at the last meeting, which will have in charge the matters pertaining to the convention of the American Foundrymen's Association, to be held in this city next year, announced that the committee had formally organized by the election of Dr. Brown as permanent chairman and August A. Miller of *The Iron Age* permanent secretary. While there had been a general discussion as to the plans for the entertainment of the visiting delegates and guests no action has as yet been taken in those matters.

The paper before the association was by Prof. Alexander E. Outerbridge, Jr., on "Recent Progress in Metallurgy." Professor Outerbridge, in addition to discussing new and interesting discoveries and practical applications in metallurgical science, presented data showing the marvelous growth in the production of iron, steel, copper, aluminum and other metals in this country. At the conclusion of his paper Professor Outerbridge was tendered a unanimous vote of thanks by the association.

Director Roberts of the United States Mint predicts a permanent advance in silver. His opinion is that it will reach 76 cents per ounce or higher within two years, and that the silver market has entered upon the most hopeful period in 20 years. Since August 1, when the buying of silver for the mints began, the price has risen from 66 to 71 cents. Within another year the effect of the Indian demand upon the market will be in evidence. China is taking more silver every year. To these demands there is to be added a large increase in the past five years in the use of silver in the arts.

Cost Accounting in the Brass Foundry.

BY D. C. EGGLESTON.

Cost system experts advocate installing a system for finding costs of production in the brass foundry which will show the current cost per pound of each mixture produced. Such a system requires adequate methods for recording the raw material used and productive labor expended, together with indirect expense for each mixture.

A "Raw Material Delivered" card is reserved for each mixture, which is ruled for entering the input and output of each heat. Monthly the amounts of metal used are priced and extended, which gives the first prime cost of production.

Each day the foreman of the brass foundry sends a "Productive Labor Report" to the payroll department. The report gives a list of the men at work on the left and across the top the names of the various classes of work, such as die, tub, floor, machine and core work. The hours worked are distributed according to the classes of work (for the benefit of the shop cost department), and totaled on the right to facilitate posting the payrolls. This method makes it easy to find the amount of productive labor assessed against each class of work monthly or for a different period if desired.

In order that the fixed charges, depreciation, insurance and taxes may be intelligently distributed it is essential that a record be kept of plant accounts, buildings, machinery, tools, patterns and fixtures. Loose leaves and card systems are best adapted for making the records, so that changes and additions to the plant can easily be recorded.

Depreciation is the amount which must be set aside to make renewals when parts of the plant are worn out or become obsolescent. The custom of setting aside a fixed sum annually of, say, 10 per cent., is a bad one. The best practice is for the plant engineer or shop superintendent to estimate the probable life of a plant, taking all conditions into account, after which it is an easy matter for the cost accountant to turn to an engineer's handbook and figure the amount which must be set aside at, say, 4 per cent. compound interest, to meet expenses for renewals when required. Insurance and taxes are fixed charges, the amount of which is not dependent upon the activity of the plant. However, the more hours the plant is in operation the more opportunity there is to spread them over a large output, thereby lessening costs of production, which is obviously a source of economy.

Changes and repairs are oftentimes important items. These include all expenses incurred in connection with making them, such as loss of time by piecework operators. The salaries of superintendents, foremen, clerks and porters are a direct charge against production. Oils, rags, waste, coal and sundry supplies given out by the storerooms clerk should be noted on the "Stores Delivered" card.

Where the brass foundry is a part of a large plant it is usually treated as a special department and transfers made from the general expense account to the brass foundry expense account. So it is desirable to have the main divisions of the foundry expense account correspond to those of the main plant, not only for purposes of making transfers, but also for distributing expense. The various items of expense incurred in connection with the brass foundry can be grouped under seven main heads—fixed charges, power, light, rent, administration, tools and sundry expense. In order that the amount of expense incurred in connection with material and that with the various classes of work may be found it is necessary to divide each of the seven classes with this end in view. Material expense includes the fixed charges on scales, racks, bins, shelves and trucks used in connection with handling material; the rental of the floor space occupied by materials; a proportionate part of the administration expense assessed against material expense on account of stockkeepers and porters, whose salaries are charged this account, and many items classed as sundry expense. The total material expense is assessed against the various jobs on a percentage basis. When it is remembered that material expense is seldom less than 5 and is sometimes as much as 12 per cent. of the cost of raw material used, it is apparent that a study of this division of brass foundry expense may suggest valuable economies.

The balance of brass foundry expense is assessed against the various classes of work, such as die, tub, machine, floor and core work. Fixed charges are common to each class of work, the same principle of distribution applying here as in other cases. Power of course is used for power ramming machines. The floor space occupied governs the final distribution of rent expense. The number of productive operators engaged in each class of work is the basis for distributing the balance to administration expense. The tools and supplies used are obtained from the stock clerk's record of stores delivered. The balance to each class of work is added to the productive labor of the corresponding class and the total distributed on the basis of the number of pounds output. Since only a few mixtures are usually made in a brass foundry at a time it is an easy matter to estimate the number of pounds produced by each class of work and load the raw material in the mixture with the proper rate per pound.

The best practice is to figure the cost per pound for producing castings made by each mixture monthly. Then all that is necessary in figuring the jobs is to note the mixture and multiply the weight in pounds by the proper rate.

An exhibit of the brass foundry expense in detail, as explained, is a valuable aid in discovering waste and stopping leaks, which are so often the dividing line between profit and loss. That the system herein outlined has been a gradual evolution to meet the requirements of a large manufacturing works recommends it to the attention of cost accountants and brass foundrymen.

Lower Iron Content in Lake Ore Bases.

In referring to the sales of Lake Superior ores for 1907 delivery it was stated in *The Iron Age* of November 8 that while the advance in the base price is nominally 75 cents for Bessemer ores, and 50 cents for non-Bessemer ores, the actual advances are greater because of the lower iron content guaranteed for next year. Instead of 56.70 units of iron in the natural state the guarantee for Bessemer ores is reduced to 55. In the case of non-Bessemer ores the guaranteed metallic iron content is 51.50 per cent. for 1907 as compared with 52.80 per cent. in 1906. The table below gives the prices and base guarantees for the two years:

	Old range.		Mesaba.	
Bessemer Ores.	1906.	1907.	1906.	1907.
Per cent. iron, 212 degrees	63.00	61.12	63.00	61.12
Per cent. phosphorus	0.045	0.045	0.045	0.045
Per cent. moisture	10.00	10.00	10.00	10.00
Per cent. iron, natural	56.70	55.00	56.70	55.00
Base price	$4.25	$5.00	$4.00	$4.75
Non-Bessemer Ores.				
Per cent. iron, 212 degrees	60.00	58.52	60.00	58.52
Per cent. moisture	12.00	12.00	12.00	12.00
Per cent. iron, natural	52.80	51.50	52.80	51.50
Base price	$3.70	$4.20	$3.50	$4.00

As in other years some ores may show a slightly higher content in 1907 than in the preceding year, but as has been frequently pointed out the prevailing tendency is toward a lower percentage in iron. The actual increase in cost to furnacemen, as represented by the sales of last week, is from 90 to 95 cents a ton on Bessemer ores and from 60 to 65 cents a ton on non-Bessemer ores.

It seems difficult of belief that public cars in New York carry far more passengers than in London. Such, however, is the case. The omnibuses, trolleys and underground carried in London, in 1905, some 604,834,000 passengers, as compared with 596,345,000 in 1904, an increase of 1.4 per cent. In New York the figures are 1,442,347,000 for 1905 and 1,341,039,000 for 1904, a gain of 7.6 per cent. Both figures are more than double the corresponding figures for London.

The American Demand for British Iron.

GLASGOW, November 3, 1906.—The arrival of the long expected demand from America has saved our iron market from the severe break which, in ordinary circumstances, would have followed the wave of depression that is now sweeping over our shipbuilding industry. A year ago we had the beginning of a boom in shipbuilding, and now we are having the reaction. The new vessel orders booked on the Clyde the past 10 months do not amount to more than a fourth, or even a fifth, of the tonnage launched. What is true here is true of the other shipbuilding centers. The cost of building has gone up, with dearer steel, copper, timber, &c., and the freight markets have gone down instead of up. Shipowners don't want new ships just now—they would rather get rid of their old ones, and even of the new ones they contracted for last year. Therefore, work in the shipbuilding yards all over the country will be slack this winter, and the most sanguine does not look for any signs of revival before the spring. Therefore, the consumption of shipbuilding iron and steel will be reduced to a minimum.

The Strike on the Clyde.

Here on the Clyde the position is made worse by a strike of the shipyard iron workers—the "black squad"—who, a month ago went out because the shipbuilding employers refused to give them an advance of 5 per cent. on piecework rates. At existing rates riveters earn from £3 to £3 10s. per week, calkers from £3 10s. to £4 and framers and platers from £4 to £5 per week. Many of the platers, indeed, can and do earn up to £6 per week on present rates. An advance of 5 per cent., therefore, is no small thing for shipbuilders to face at any time, but they could not look at it when they were running out of work and when to obtain new work lower and not higher costs are necessary. The men, however, went on strike, and have consequently thrown idle large numbers of "white squad" operatives (carpenters, joiners, painters, brassworkers, and the like). Thus our shipyards here are practically at a standstill, and have ceased for the time being to consume steel or iron at all in any shape. The strike has lasted a month, and it may last many months, though proposals for a settlement are floating about.

The shipbuilders of Scotland used to be the principal consumers of the steel made in Scotland, and at one time the stoppage of the Clyde shipyards would have compelled the stoppage of all our steel works and of one-half our blast furnaces. But steel makers have so extended their works and adapted them to other products that not more than about 25 per cent. of their output is now designed for local shipbuilders. That proportion is left on their hands by the present strike, but to compensate for this there has been an increased export demand for steel material, including even ship plates for the Continent. This has kept the pinch of the strike off them so far, but they are now beginning to miss the specifications of shipbuilders for their plate mills, which they will soon have to slow down if the strike continues. Under the circumstances the project of the Scotch shipbuilders to start a steel plant of their own has dropped meanwhile out of the range of practical business.

The Export Trade.

About one-half of the blast furnaces in Scotland make hematite iron, which is all consumed by the Scotch steel makers. Little or none of this iron is usually exported, and we even import hematite iron from Cumberland. The exports of Scotch pig iron are all of foundry sorts, and these exports have been run up by a succession of orders from your side. These orders have now been coming in for some weeks, though they are not so much advertised as are the orders for Cleveland iron, which have also been coming in freely and the advent of which has sent Cleveland warrants up almost to record prices. Up to now some nine steamers have been chartered to load Cleveland foundry iron in the Tees for the United States. The total quantity of Cleveland iron for which charters have been announced does not exceed 50,000 tons, but it is believed that a good deal more has been bought for America and that the transactions are not reported for freight reasons.

As for Scotch iron, all the available freight room on board the regular liners to New York and Philadelphia has been engaged for some time, at rates which began at 5 shillings per ton, and have progressed upward to 7 shillings 6 pence per ton. But as the space by local liners is limited, a good deal has been engaged by the Liverpool liners, and the iron is sent round from here by coasters. Quite a number of coasters have been chartered to take iron round from the Clyde to Liverpool in November for shipment, thence to New York and Philadelphia, and the through freight works out somewhat less than the rates per direct liners from Glasgow. But in addition whole steamers are being chartered, as, for instance, the Winnie to load 3000 tons at Glasgow for New York at 6 shillings 3 pence freight. This is counted as equal to 5 shillings 9 pence from Middlesbrough, because at the latter port are 3 pence of harbor dues, which at Glasgow at 6 pence per ton, are paid out of the freight. A cargo of Scotch hematite iron has also been sold for shipment to America, which is quite an unusual occurrence. A good deal of Scotch ordinary iron has been bought for shipment to the United States, besides that for which freight has been engaged, and it is believed in some quarters that most of the Cleveland warrants are now held by, or for account of, America, though this seems an exaggeration. However, there are now only 558,000 tons of No. 3 iron in these stores, and the quantity is being reduced daily to meet shipping requirements. The reduction since March 1 is 200,000 tons.

Buying by Both Germany and America.

The American orders alone could not have sent up warrants and caused makers to raise their prices all round, but these orders have followed upon a long course of heavy buying by Germany. The German orders have been coming in more and more freely for some two or three months, and the shipments would have appeared larger than they were but for the interruption of inland navigation in Germany by the want of water in the rivers. As it is our exports in the nine months ending September were 425,000 tons more than in the corresponding portion of last year, and so much has been purchased for shipment that the figures of the next two months of the year will add very materially to that increase. In fact, it would seem that at present smelters cannot deliver quickly enough to suit shippers, and some impatient spirits predict that the whole of the Cleveland warrant stock will be wiped out before the end of the year. It may easily be if American orders continue to come in as fast as they have been doing, and if Germany also goes on buying.

At present makers have no stocks and the warrant stock is 150,000 tons less than it was a few weeks ago. To load large vessels it is better to take iron out of store at Middlesbrough than from makers, because very few makers can take a vessel of 4000 or 5000 tons alongside their yards, while the warrant stores can.

We have then the curious position that pig iron has been sustained and is still on the up grade in our market, while our largest consuming industry is on the down grade. That position was due first to the action of Germany and now to the action of America. The future course now depends on how much further the American buying may go. Cleveland foundry iron has reached 3 shillings 6 pence per ton above the price which the operators in the corner compelled the shorts to settle at in May of last year. After that settlement the price dropped to 45 shillings. That was the trade price. At 58 shillings 6 pence the trade price marks an advance of 13 shillings 6 pence, but that trade price cannot be sustained by our domestic consumption; therefore, when American and German buying falls off the market will fall away. Meanwhile it bears heavily on our iron manufacturers, as does 70 shillings for hematite warrants on our steel manufacturers. But as the demand for hematite is falling off at home and as the demand for foundry iron is increasing from abroad several of the Scotch furnaces are being this week taken off hematite and turned on ordinary iron. Inquiries from the United States have affected the hematite market on the East Coast and 70 shillings is now asked for mixed numbers, while the same figure is quoted at Barrow. B. T.

Alcohol Exhibit at Jamestown Exposition.

WASHINGTON, D. C., November 13, 1906.—Prof. Charles E. Munroe, who is at the head of the school of chemistry of the George Washington University, in this city, has been designated by the Jamestown Exposition Commission to prepare an elaborate exhibit covering the production and chief uses of denatured alcohol. The exposition will be opened in May, 1907, and will be participated in by the United States Government, which has appropriated $1,575,000 for the purpose, and by the leading countries of Europe. Professor Munroe has prepared a memorandum with regard to the alcohol exhibit which contains information of importance to all prospective exhibitors, and of which the following is an abstract:

The Special Alcohol Exhibit will occupy one-half of a special building—the other half to be devoted to the Government Fuel Testing Display of the Geological Survey. As the space which may be devoted to this purpose is limited, discretion will be exercised in the admission of exhibits. The policy pursued is to gather here only the most representative and best types of each description of apparatus, machine, appliance or product, and to secure a collection which shall, from this point of view, be complete and comprehensive. To lend interest to the exhibit it is desired that the engines, actuated by alcohol, shall be doing work; that the building shall be lighted by alcohol burners; that demonstration shall be made of the methods of use of the other devices, and that many manufacturing operations shall be carried on. In addition careful scientific tests may be made of the efficiency of alcohol as compared with other sources of energy in doing useful work.

Classification of Exhibits.

Several schemes of classification are possible, but it is deemed that the interests of the patrons of the exposition, as well as those of the exhibitors, will be best subserved by the following:

Class A—Apparatus and Appliances for Use in the Household.

1. Lighting.—Historical exhibit, with pictures, drawings and other illustrative matter, lamps, chandeliers, artistic designs for lighting apparatus.

2. Heating.—Historical exhibit, with pictures and other illustrative matter, stoves for heating and for cooking, sad irons, driers, chafing dishes, cigar lighters, water heaters, toilet appliances.

Class B—Apparatus and Appliances for Industrial Uses.

Alcohol torches, high temperature burners, blast lamps, engines, stationary and mobile, for use on land and water, special devices actuated by alcohol motors.

Class C—Products of Manufacture in Which Alcohol Is Used.

Chemicals of which alcohol forms a component part, chemicals and pharmaceuticals made by the aid of alcohol, photographic materials, pyroxylin plastics, incandescent mantles, hats, varnishes.

Class D—Manufacture of Alcohol.

Materials for use in the manufacture of alcohol, such as malt, corn, potatoes, molasses from the sugar cane and beet, and other substances; pictures, photographs, plans, models and statistics of distilleries for the manufacture of alcohol from grain, potatoes, molasses and other materials through fermentation; small working distillery in operation; by-products from the manufacture of alcohol, such as cattle foods, corn oil, fusel oil and other substances; apparatus used in distilleries, such as stills of various forms, column and other condensers, cookers, driers and filters; methods for production of "grain" alcohol from wood, with diagrams and samples of materials and products; photographs, diagrams, models and statistics of factories for the manufacture of wood alcohol by the destructive distillation of wood, illustrating the retort, oven and kiln methods and refineries; model wood distillation factory in operation; materials produced by the dry distillation of wood and in the further refining of the crude product; working plant for denaturizing alcohol in accordance with the regulations prescribed by the U. S. Commissioner of Internal Revenue; materials used for denaturizing alcohol or proposed for this use in various industries in the United States and foreign countries.

Cost of Exhibiting.

There has been a great deal of complaint at previous expositions on account of cost of exhibiting. The management intends there shall be no such complaint at the Jamestown Exposition; with this in mind it is already taking such steps as will insure to the exhibitor the very best of everything in the matter of installation and maintenance of his exhibit at the lowest possible cost. The system under which exhibits will be judged and awards made has been carefully worked out, and every exhibitor may rest assured that he will receive fair treatment in this respect.

Manufacturers who are interested in the alcohol question are invited to indicate their desire to consider the matter of an exhibit by requesting Professor Munroe to forward an application blank, which will be promptly sent, together with the rules and regulations covering the exhibits. Assignment of space will be made as early as possible, in order to give exhibitors plenty of time in which to prepare their exhibits. W. L. C.

Aluminum Production in 1905.

WASHINGTON, D. C., November 13, 1906.—The production of aluminum in the United States has increased nearly tenfold in as many years, according to the annual report of the United States Geological Survey of 1905. Two reasons explain this phenomenal growth—economic production, which has initiated lower prices, and increased consumption, especially in the electrical industry.

The statistical history of the production of aluminum in the United States is shown by the following table, which gives the output by years and the total production since the beginning of the industry in 1883:

Year.	Quantity. Pounds.	Year.	Quantity. Pounds.
1883	83	1896	1,300,000
1884	150	1897	4,000,000
1885	283	1898	5,200,000
1886	3,000	1899	6,500,000
1887	18,000	1900	7,150,000
1888	19,000	1901	7,150,000
1889	47,468	1902	7,300,000
1890	61,281	1903	7,500,000
1891	150,000	1904	8,600,000
1892	259,885	1905	11,347,000
1893	333,629		
1894	550,000	Total	68,409,779
1895	920,000		

Aluminum and manufactures thereof produced in the United States were exported in 1905 to the value of $290,777, as compared with $166,876 in 1904 and $157,187 in 1903.

In the fiscal year 1906, which includes the latter half of the calendar year 1905 and the first half of the calendar year 1906, the imports of aluminum were as follows: Crude, 614,179 lb., valued at $122,862; leaf, 2250 lb., valued at $523; plates, 11,094 lb., valued at $7075; other manufactures valued at $1179.

Output of Bauxite.

The production of bauxite in the United States in 1905 amounted to 48,129 gross tons, valued at $240,292, as compared with 47,661 gross tons, valued at $235,704, in 1904. The production of bauxite in Alabama and Georgia seems to be on the decline, while the output in Arkansas is increasing rapidly. The combined production of Alabama and Georgia in 1905 amounted to 15,173 gross tons, as compared with 21,913 tons in 1904 and 22,374 tons in 1903. The output of Arkansas in 1905 was 32,956 tons, compared with 25,748 tons in 1904 and 25,713 in 1903. The total production of the United States in 1889, the earliest year for which the Survey has reliable figures, was 728 tons, valued at $2366. The output has been characterized by many fluctuations since production was undertaken on a large scale. It rose to 10,518 tons in 1892, and after declining to 9179 tons in 1893 rose steadily to 35,280 tons in 1899. It then decreased to 18,905 tons in 1901, after which it rose again to the maximum figures of 1905. In addition to the home production, 11,726 gross tons of bauxite, valued at $46,518, were imported in 1905, making a total apparent consumption of 59,855 gross tons, volued at $286,809.

Bauxite is used chiefly in the manufacture of aluminum, but to some extent in the production of alum and aluminum salts. W. L. C.

The Pennsylvania Railroad Company, in advancing its employees' wages 10 per cent., will add about $12,000,000 to its annual outlay. The significance of such action is impressed by the statement that this increase represents about one-seventh of the entire dividend payments on all American railroads nine years ago.

THE IRON AGE

1855—1906.

New York, Thursday, November 15, 1906.

DAVID WILLIAMS COMPANY, - - - - - - - PUBLISHER
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Pig Iron Capacity Still Growing.

Expanding pig iron capacity is not only a feature of the early stages of a period of good times, becoming more pronounced as the demand for iron increases and prices advance, but it has been marked also when prices have reached an unusually high level and with the chances of reaction correspondingly greater. On August 1, according to data gathered by the American Iron and Steel Association, there were 19 coke furnaces under construction in the United States, with an estimated annual capacity of 2,642,000 tons of pig iron. But on top of this the months of September and October have probably brought forward plans for more new furnaces on which work will begin in the immediate future than has any equal period that can be named. In the Pittsburgh District the new list includes three furnaces for the United States Steel Corporation and four for the Jones & Laughlin Steel Company, while in the Buffalo District are a seventh furnace for the Lackawanna and the new furnace of the New York State Steel Company. In the Ironton, Ohio, District one new merchant furnace has been decided upon and a second is probable. The annual capacity of these furnaces decided upon in the past two months is about 1,700,000 tons. Of the new capacity building on August 1 three, representing an annual capacity of 425,000 tons, are now in blast, and three, of an annual capacity of 300,000 tons, are scheduled to blow in this month. Leaving out the latter, the furnaces now building and those for which definite plans have been announced represent therefore an output of 3,617,000 tons a year. Of this total all but 320,000 tons a year is for the account of steel companies.

Unusual Demand for Locomotive Cranes.

It is customary to speak of times of slack demand, when every economy in production must be made use of as most conducive to the introduction of labor saving machinery. It is being demonstrated in the present period of probably unprecedented labor scarcity that prosperity may also tend in the same direction. An example is found in the remarkable business builders of locomotive cranes have had in the past year or two. It is not simply a case of an increased demand due to a large amount of construction work and the provision of handling facilities for new and enlarged manufacturing plant. All this is in evidence; but the new feature is that manufacturers, contractors, railroads, all the interests that have constantly the problem of handling and rehandling material, have been forced to make larger use of this valuable and adaptable machine because of the scarcity of laborers for many forms of service in which hand labor has been ordinarily employed.

No doubt the special development of the efficiency of the grab bucket in the past two years has done much to open new lines of service for locomotive cranes. Railroads have been installing many of them for the coaling of locomotives, and in many situations in which their mobility and adjustability are prime recommendations they have been employed with excellent results. Contractors, unable to get the needed supply of men for excavation and for unloading and handling materials of construction, have invested in a locomotive crane where formerly such an outlay would have been considered prohibitive. The result has been that builders of these useful machines have been pressed for deliveries for many months and to-day have orders on their books in excess of any previous record. Not only is construction work in all parts of the country still of enormous proportions, but no relief appears in sight for the acute scarcity of the kinds of men ordinarily available for operations only requiring physical strength and endurance.

The Modern Machine Tool and Its Critics.

The impression seems to exist among users of machine tools and among some of their builders that what has been termed a reaction in machine tool design will be felt in the next few years. The idea is not that the wonderful improvements which have brought so great a change in the efficiency and convenience of manipulation of machine tools will be discarded, but that they will be applied in simpler form and combined with features of design which have been to an extent abandoned in the exceedingly rapid evolution that has characterized the trade of recent years. It is rather a common incident to hear a user of machine tools assert that some machine is not so useful a tool as was its predecessor from the same works, a criticism frequent enough at all times from the class of men who dislike to adopt anything that is radically new, but rather rare in the past from progressive manufacturers quick to accept improved methods of production. It is this latter class of men whose words are important, and they are frequently heard to utter this criticism. Such a critic will proceed to demonstrate that a certain lathe, or milling machine, or planer was a more practical tool, with the promise of a longer life of usefulness in its old model than in its new, basing his statement upon his experience in his own shop. Some of the machine tool builders do not hesitate to say that these criticisms are by no means unfounded. They point out that competition is largely to blame, coupled with the demand of customers that machines shall have the latest improvements.

One machine tool builder after another has brought out new features of his own, and each must meet the other. Elaboration follows elaboration. As one manufacturer of tools put it, there has been no time for a thorough weeding out process in the designing room, and many of the new features have not existed long enough for practical test in manufacturing to ascertain whether improvements are really improvements or whether they constitute a retrogression in design when considered from the standpoint of the manufacturer who uses them. To sum up the question, Has the machine tool builder gone too far or too rapidly in changing his tools; has his design been too radically altered; has he given his machines too great a complication of mechanisms; will his latest models work out as an actual advantage in the works of his customer as compared to the tools he used to build?

Doubtless there is something in present conditions of design which needs attention, and doubtless the machine tool builders realize this better than do their customers. It is demand that governs the market for machinery, and if a reaction is to be felt it will come from the wishes of the customers. The splendid achievements of the

American machine tool designer will not be cast aside, but they may perhaps be reapplied in places to give a simpler machine, and good features that have been discarded will be revived if later ideas prove to be their inferiors.

It must not be understood that this criticism constitutes a serious matter. We mention it more because it may herald a mild reaction in design rather than as a matter for immediate and imperative consideration. It should be borne in mind that the evolution of the machine tool has been so exceedingly rapid in the past few years that it would be most remarkable it the thing had not been overdone. It is a matter of congratulation that the American machine tool builders, with whom originate most improvements, great and small, have kept so well within the confines of strict usefulness in their machines. Perhaps the limit of complication has been reached, and the time may be near when a return to simpler forms of tools will be the fashion. Of course much of the new development of the machine tool has been with the idea of specializing production, as in the automatics. The criticism does not appear to extend to them. It deals only with the standard types of machines. Customers will want the improvements, but they will want them within the limits of their needs in manufacturing. This is what the machine tool builders are realizing more and more, and as a consequence simplified forms of the latest types of machinery may be expected to constitute important factors in the trade of the near future.

Adopting the Micrometer Caliper.

Builders of machinery which is employed in the manufacture of precise work have not been able to overcome the reluctance of some manufacturers to adopt the micrometer caliper. The prejudice against the instrument appears to be based chiefly on an incredulity that the human hand is sensitive enough to handle the instrument in measuring halves or quarters of thousandths of an inch. The result is that certain machines, notably grinding machines, lose much of their real usefulness in some works. To-day a quarter of a thousandth is an accepted measure in the best machine shop practice. It is quite commonly used as a limit of variance from a standard size. Parts are produced by the thousand with no greater variation than this. Yet there are those who will not accept the established practice of using the only instrument which can measure work to this degree of precision. The ordinary spring caliper will not do it, excepting in the hands of an unusually skillful workman. But it is perfectly possible for an inexperienced workman to use the micrometer caliper in ordinary every-day work and get the necessary results, exacting though they may seem to be.

The great trouble is that men do not realize how very accurately they had been working in the days before precision was required by new conditions. The entrance of an arbor into a bored hole means a fraction of a thousandth of an inch per inch of arbor, and this often afforded a measure of work before the micrometer came into its present general use. The standard gauge, to which men worked for years, is really nothing more nor less than a micrometer of a set size. Most builders of machine tools have accepted the micrometer in every-day work, but still there are a few who have not and in other branches of machinery manufacture the number is probably greater. It should be borne in mind that the machine practice of to-day is very different from that of a decade ago. Greater demands are made upon machinery, and to insure the durability and accuracy of mechanisms there must be the best possible workmanship. The micrometer assists materially in securing these conditions, and, what is a really important factor in the question, a rather inferior workman can do work with its aid that would otherwise require the services of a highly trained mechanic. Doubtless the new practice will be universally accepted before a great while, as necessity compels it, in machine shops. The sooner it is adopted the better for the shop owner.

Stamping Out Tuberculosis in Factories.

The Brown & Sharpe Mfg. Company is actively cooperating in its shops at Providence, R. I., in a determined effort being made in that city to stamp out tuberculosis. Although not sufficient time has elapsed to demonstrate the full success of the undertaking, nevertheless enough has been accomplished to show the practical good which comes from watching for the existence of the disease in a manufacturing establishment. This movement to stamp out tuberculosis in shops and factories began with the efforts of a Providence physician, Dr. Frank T. Fulton, who is trying to bring about a general effort among physicians to rid the city of the disease by intelligent treatment. He offered to the Brown & Sharpe Company, and to one of the large textile manufacturers of the city, to treat free of charge all cases of consumption that might be sent him from the works, the other part of the contract being that the manufacturers should actively assist in the movement among their men. This undertaking was begun about eight months ago. The first step was to post a notice in the works, as follows:

> A strong effort is being made to exterminate the disease consumption. It is known to be very easily curable if the treatment is begun in the early stages, and readily prevented by proper ways of living. The hopeless or incurable cases are those which have been allowed to go neglected. There are in Providence about 1500 cases, and many of them are, of course, among the workmen in the mills. Several organizations are trying to provide means by which any one can obtain the proper treatment. To aid in this matter, the mill authorities have provided, free of expense to the employee, a physician who is especially interested in this disease and who can advise about the best treatment. It is strongly urged that any one who has a cough, be it ever so slight, should see this physician and be examined. If the lungs are found to be healthy there is then no need to worry. If, on the other hand, there is any disease it can be treated before it is too late to be cured.

It was necessary that the shop management cooperate actively in this work in order that employees might take advantage of its beneficence, and this was done in the case of the Brown & Sharpe Company. Some employees took advantage of the privilege of their own accord, others were given the benefit of suggestion and willingly followed the well meant advice. Still others had to be induced with more effort. A number of cases were discovered among the men. Some went to the State Sanatorium, where they were given the modern open air treatment. All were urged to take up open air work, and wherever possible the company found such work for them, pending the time when they could return cured to their old employment. No tubercular person was permitted to remain in the works, for his own sake as well as for that of his fellow workmen. Sanitary precautions were taken, not in an unusual way, but sufficient to prevent the spread of the disease if its germs still exist in the works.

It will need a winter to reveal the permanence of cures apparently effected, but men have returned to work robust and generally in fine condition, thanks to a short turn in a sanatorium or other treatment coupled with outdoor living. The general health of the body of work-

men, some 4000 in number, has been bettered, and danger of infection has been removed. It is not proposed that tuberculosis shall again establish itself at the Brown & Sharpe works, even to the extent that has prevailed, which was probably less than in most manufacturing establishments, sanitary conditions always having been of the best. Other works of Providence and vicinity, all textile industries, have taken up the work since the start was made, and all report the same general results.

Few, if any, large manufacturing establishments in this country are free from tuberculosis among their employees. There must be a certain danger of infection, and cases of afflicted workmen are traceable to the environment of their employment. Physicians everywhere are interested in the effort to wipe out the seeds of this dreaded disease, and probably there are many who would gladly assist in a work such as that undertaken in Providence. It is a well known fact that pulmonary tuberculosis is so insidious in its workings, carrying with it a mental buoyancy which makes its victim optimistic of his condition, that oftentimes influence must be brought in order to have him seek a professional diagnosis of his condition. It is among the apparently superficial colds and coughs that the incipient cases are found, and the suggestion of the employer, or those responsible to him in the management of the works, is the one thing needed to stimulate the desire for an examination by a physician and the following of his advice as to treatment. Doubtless the future will see very strict regulations governing tuberculosis. Those progressive men who are doing the work of their own volition at the present time are merely anticipating what may be made compulsory.

CORRESPONDENCE.

The Use of Oxygen in Removing Blast Furnace Obstructions.

To the Editor: In *The Iron Age* of May 17, 1906, is an interesting article on "The Use of Oxygen in Removing Furnace Obstructions" by the Chevalier C. de Schwarz, Liège, Belgium. He shows how oxygen and hydrogen under high pressure can burn a hole through a solid block of cold iron or steel, say 16 in. thick, in one or two minutes. I have thoroughly investigated the use of this process in Europe by the Koeln-Muesener Bergwerks-Actien-Verein in Kreuzthal and have obtained the following particulars:

This process is covered by patent No. 137,588, issued by the German Government to the above mentioned firm. Nearly all important works in Germany have a license for using it, the list including the Krupp Works, Phoenix, Rheinische Stahlwerke, Gutehoffnungshuette, the works in Differdingen, in Peine, and Ilsede—all of which will be recalled by the American mining engineers who visited Germany last summer. A year ago 80 different works in Germany, England, Italy, France and Luxemburg were using the process.

I have read many certificates of its satisfactory working in opening hard holes and plugged up tuyeres of blast furnaces. A peculiar case was that of the worm gear of a ladle which had been damaged by iron so that the ladle could not be tilted; a hole was burnt through the bottom and a part of the metal and the ladle itself were saved. Fritz W. Luermann, the well-known German metallurgist, tells of one experiment in which a 1⅜ in. hole was burnt in a very short time through a solid block of wrought iron 6 in. thick. A second experiment he speaks of is as follows: A wrought iron plate ¾ in. thick and a copper plate were screwed together and in 65 seconds an oval hole 2¾ in. x 2 in. was burnt through the iron plate without touching the copper plate, showing that it is possible to burn out a plugged-up tuyere without spoiling it.

To the question, why is it not possible to introduce this useful method in our country, the answer is, we are hampered by the law. So far as I know, it is only permissible to ship gases under a pressure of 250 lb. or less, whereas we should be allowed a pressure of 500 to 1000 lb. We have no works here that compress oxygen and hydrogen to such pressures. In Germany, with its multitude of safety rules and laws, the Gesellschaft fuer Lindes Eismachine, in Munich, Bavaria, compresses oxygen to 125 atmospheres, or about 1750 lb., and the Chemische Fabrik Electron compresses hydrogen even to 150 atmospheres, or 2100 lb., the maximum pressure allowed in Germany. Ship companies, however, refuse to load steel flasks with gases under such high pressure, in Germany called "bombs," notwithstanding they have been tested to 450 atmospheres, or 6300 lb.

The only way to secure the benefits of the oxygen process in the United States would be to change the law regulating the shipment of compressed gases. I do not see why it should not be possible. I would be very glad to know what others of more experience have to suggest for the introduction in the United States of a method so useful to the whole technical world.

OTTO JASCHKE.

CHICAGO, November 1, 1906.

The Gayley Dry Blast and German Engineers.

To the Editor: Referring to the letter of J. E. Johnston, Jr., of November 3, I agree with the writer that an indefinite extension of our discussion, as provoked by his letter of October 25, is undesirable from any point of view. Since Mr. Johnston has satisfied my request to designate the sources on which he based his refutation of Professor Osann's theory, I leave it to that authority to reject or to acknowledge whatever seems to him in accord with his scientific conviction, my position in this matter being simply that of the critical observer trying to elucidate the truth.

Responding to the suggestion advanced by Mr. Johnston, and for which I am indebted, I shall refrain from forming an ultimate opinion of the merits of the Gayley process until after having learned what Professor Osann has to say in support of his theory.

In exchange of the courtesies extended I would suggest that Mr. Johnston refer to a series of articles which I have lately published in *Power*, New York, beginning November, 1905, and treating of the "Design, Construction and Application of Large Gas Engines in Europe." The gratifying recognition which these articles have received among professional circles in this country encourages the belief that a careful study of the basic truths evolved therein will help to clarify Mr. Johnston's somewhat traditional views on the question of "redesigning the gas engine and adapting it to the purposes of American metallurgical practice." F. E. JUNGE.

NEW YORK, November 12, 1906.

The Dominion Company's October Output.—The Dominion Iron & Steel Company, Sydney, Canada, reports its production in October as follows:

	Net tons.
Coke	34,000
	Gross tons.
Pig Iron—No. 1 furnace	8,087
No. 2 furnace	6,840
No. 4 furnace	8,398
Total	23,325
Open hearth steel ingots	25,425
Blooms	22,553
Rails	14,621
Billets	6,238
Wire rods	4,214

New records were made for coke, pig iron and ingots and by the blooming mill and rod mill. Of 10 open hearth furnaces only eight were in operation the whole month; one was under repair six days and another three days at the beginning of the month. Rods were made in a Morgan continuous mill working only day shift, but running a few hours overtime each week for three weeks. The rail mill was not worked to its capacity. Its bloom supply was limited by the consumption of 9500 tons of steel for rod billets, axle blooms, &c.

Poor's Railroad Statistics for 1905.

We are in receipt of an advance copy of the *Introduction to Poor's Manual* for 1906, which gives statistics of the steam railroads of the United States in 1905. It states that the length of railroads completed December 31, 1905, was 217,341.02 miles. The net increase of mileage of all railroads in the United States of the calendar year 1905 was 4,946.78 miles. Of these railroads the number of miles not covered by reports to the editor of the *Manual* was 3,630.53. From this publication we have taken the following statistics as of special interest to our readers:

General Statistics.

	1905.	1904.
	Miles.	Miles.
Mileage of railroads	212,624.18	211,074.39
Second track, sidings, &c.	88,707.57	82,863.03
Total track	301,331.75	293,937.42
Steel rails in track	290,529.24	282,229.35
Iron rails in track	10,802.51	11,708.07
	Number.	Number.
Locomotives	49,616	47,844
Cars—Passenger	30,777	29,205
Bag, mail, &c.	10,552	10,417
Freight	1,757,105	1,691,427
Total revenue cars	1,798,434	1,731,049

Assets.

Cost of railroad and equipment	$12,143,997,551	$11,664,191,134
Other investments	2,935,276,877	2,712,445,967
Sundry assets	367,454,847	408,808,136
Current accounts	772,844,570	637,328,078
Total assets	$16,219,573,845	$15,422,873,315

Liabilities.

Capital stock	$6,741,956,825	$6,447,045,374
Bonded debt	7,821,243,106	7,462,091,455
Unfunded debt	201,978,773	172,619,537
Current accounts	620,720,096	516,404,178
Sinking and other funds	182,853,229	203,962,204
Total liabilities	$15,568,752,029	$14,802,122,748
Excess of assets	650,821,816	620,750,567
	Miles.	Miles.
Miles of railroad operated	215,506.92	211,835.21

Receipts.

Revenue train mileage:		
Passenger	$467,270,447	$446,890,386
Freight	559,434,683	543,447,633
Mixed	26,715,494	28,069,524
Totals	$1,053,420,624	$1,018,407,543
Passengers carried	745,446,641	719,173,676
Tons freight moved	1,435,321,748	1,295,527,441
Traffic earnings—Passenger	$486,420,902	$456,342,380
Freight	1,478,167,246	1,377,281,206
Miscellaneous	147,609,622	144,015,127
Totals	$2,112,197,770	$1,977,638,713
Net earnings	685,464,488	639,240,027
Other receipts	80,927,659	81,357,891
Total available revenue	$766,392,147	$720,597,918

Payments.

Interests on bonds	$247,155,897	$242,992,755
Other interest	12,956,346	13,533,529
Dividends on stock	193,753,869	188,386,093
Miscellaneous	59,856,679	54,557,670
Rentals—Interest	31,716,773	32,807,445
Dividends	22,314,069	23,254,134
Miscellaneous	22,208,880	18,120,396
Taxes	54,553,620	54,325,856
Total payments	$644,516,133	$627,977,878
Surplus	121,876,014	92,620,020

Following are statistics of track material and rolling stock equipment for the past 10 years:

				Revenue cars.		
Year.	Miles steel rails.	Miles iron rails.	Locomotives.	Passenger.	Baggage, mail and express.	Freight.
1896	210,290	28,440	36,388	24,940	7,880	1,245,640
1897	215,658	26,043	36,410	25,654	8,180	1,234,972
1898	220,804	24,435	36,746	25,844	8,049	1,284,807
1899	228,976	21,387	37,245	26,184	8,121	1,328,084
1900	238,464	19,389	38,065	26,786	8,209	1,350,258
1901	246,811	19,181	39,729	27,144	8,667	1,409,472
1902	257,437	17,398	41,626	27,364	9,726	1,503,949
1903	271,013	15,249	44,529	28,648	10,182	1,624,150
1904	282,229	11,708	47,344	29,205	10,417	1,691,427
1905	290,529	10,803	49,616	30,777	10,552	1,757,105

Railroad construction in the United States by geographical divisions during the years 1902-1905 was as follows:

States.	1902. Miles.	1903. Miles.	1904. Miles.	1905. Miles.
New England	76.91	12.26	25.83	65.03
Middle	201.38	346.72	236.75	233.83
Central Northern	627.68	486.87	565.49	744.36
South Atlantic	637.32	219.38	660.37	678.46
Gulf and Mississippi Val.	327.85	602.31	728.92	735.64
Southwestern	2,179.34	1,891.75	1,715.61	1,140.37
Northwestern	671.17	683.35	469.50	878.97
Pacific	353.99	432.59	600.10	573.56
United States	5,075.64	4,675.23	5,002.57	5,050.22

Following is a statement showing miles of railroad from 1875 to the close of 1905, inclusive:

Year.	Miles in operation.	Annual increase of mileage.	Year.	Miles in operation.	Annual increase of mileage.
1875	74,096	1,711	1891	170,729	4,026
1876	76,808	2,712	1892	175,170	4,441
1877	79,082	2,274	1893	177,516	2,346
1878	81,747	2,665	1894	179,415	1,899
1879	86,556	4,809	1895	181,115	1,700
1880	93,262	6,706	1896	182,769	1,654
1881	103,108	9,846	1897	184,591	1,822
1882	114,677	11,569	1898	186,810	2,219
1883	121,422	6,745	1899	190,818	4,008
1884	125,345	3,923	1900	194,262	3,444
1885	128,320	2,975	1901	198,743	4,481
1886	136,338	8,018	1902	202,938	4,195
1887	149,214	12,876	1903	207,335	4,397
1888	156,114	6,900	1904	212,394	5,059
1889	161,276	5,162	1905	217,341	4,947
1890	166,703	5,427			

A statement showing miles of railroad, capital stock, bonded debt, bonded debt per mile and cost of all steam railroads in the United States from 1896 to 1905 is as follows:

Year.	Miles of railroad.	Capital stock. Total. $	Bonded debt. Total. $	Total stock, bonds, equipment obligations, &c., representing approximately cost of road and equipment. Total. $	Per mile. $
1896	181,394	5,373,187,619	5,461,856,798	11,179,544,386	61,631
1897	183,547	5,602,964,449	5,534,432,492	11,518,066,646	62,753
1898	184,894	5,581,522,858	5,635,363,594	11,585,069,036	62,658
1899	187,781	5,742,181,181	5,644,858,027	11,692,817,066	62,268
1900	192,162	5,804,346,250	5,758,592,754	11,891,902,339	61,884
1901	195,887	5,978,796,249	6,035,469,741	12,326,491,526	62,926
1902	199,685	6,078,290,596	6,465,290,839	12,853,927,302	64,371
1903	206,886	6,355,207,335	6,722,216,517	13,525,623,300	65,380
1904	211,074	6,477,045,374	6,908,799,403	14,081,756,366	66,715
1905	212,624	6,741,956,825	7,425,261,901	14,563,199,931	68,493

A suggestive comparison of freight and passenger rates, and the return on stocks and bonds during the past 10 years, is brought forth in the following table:

Years.	Interest, average rate Per ct.	Dividends, average rate. Per ct.	Per ton per mile, average rate. Cents.	Per passenger per mile, average rate. Cents.	Earnings per mile of railroad in operation. Gross. $	Net. $	Percentage of expenses to earnings.
1896	4.45	1.52	0.821	2.032	6,223	1,840	70.43
1897	4.24	1.51	0.797	2.029	6,228	1,884	69.74
1898	4.21	1.71	0.758	1.994	6,771	2,111	68.16
1899	4.26	1.92	0.726	2.002	7,161	2,272	68.27
1900	4.27	2.44	0.746	2.031	7,826	2,519	68.93
1901	4.24	2.65	0.756	2.028	8,270	2,668	67.73
1902	4.10	2.97	0.764	2.012	8,696	2,830	67.45
1903	4.17	3.03	0.781	2.052	9,301	2,887	68.96
1904	4.01	3.31	0.793	2.058	9,248	2,989	67.68
1905	3.79	3.27	0.784	2.028	9,643	3,135	67.49

The output for October at the South Works of the Carnegie Steel Compay, South Sharon, Pa., and at the North Works at Sharon, Pa., was the largest in any one month in the history of these two plants. The output of the open hearth department of the South Works was 53,273 gross tons, against 52,015 tons, the previous record last March. The blooming mill produced 32,463 tons, the previous record being 31,030 tons. The output of the open hearth department at the North Works was 13,022 tons, the previous record being 12,962 tons. The company was handicapped by reason of one of the blast furnaces being out of blast the greater part of the month.

The Chicago Northwestern Railway Company, Chicago, is stated to have decided to install on its locomotives mechanical stokers invented by W. H. Strouse, Oskaloosa, Iowa.

The Control of the Chill in Cast Iron.

Articles made of cast iron with a chilled surface are applicable to an extended variety of purposes. The two great uses at present are chilled rolls, for iron or steel rolling mills, and car wheels. Among others that may be mentioned are crushing rolls for ore or stone, squeezers, die presses, anvils, grinding and grist machinery and axle bearings. A serious competitor in certain lines of work is Hadfield's manganese steel.

By the chill is understood the layer of white iron of variable thickness, produced by casting against metal. The chill is usually on the outside of the casting, but may be produced in other places by using a metal core. The regulation of the amount of chill has always been a very difficult matter. In many foundries to-day it is in the hands of only one or two men, who, often uneducated, have gained their special knowledge by long experience and observation.

Carbon Causes the Peculiar Appearance of the Chill.

The reason for the difference in the appearance of the chill part of the iron and the gray interior is the difference in the condition of the carbon. This element, the great determining factor in steel, exerts an important influence on cast iron. Wrought iron, steel and cast iron are all of one family. The difference is one of degree only, not of kind, and it is for this reason that it has been such a difficult matter to frame sharp and suitable definitions for the three products. When cast iron is considered in this way, as closely akin in its nature to steel, it is natural to suppose that the carbon is the element to which most attention should be paid.

In steel, however, the carbon is almost always combined, while in cast iron it is found both combined and free. There are several different states of combination, and the free carbon exists in more than one variety. At the present time much attention is being paid to these variations of the two great classes of carbon—combined and free. The other elements usually found in cast iron —silicon, manganese, sulphur and phosphorus—exert a certain influence of their own. Their greatest effect, however, is produced through their indirect effect on the carbon, tending to alter the ratio of the combined to the free carbon.

In the chill the carbon is combined, and the carbide of iron is of the hardness of quartz and of silvery appearance. The gray part of the iron owes its color to the free carbon or graphite, which is soft, black and lusterless. It usually occurs as plates throughout the iron. Between the gray interior and the white chill of the casting is a transition layer, which varies in amount and appearance. Sometimes the line of division is sharp and well defined, in other cases the chill changes gradually into the gray iron of the body of the casting. For most classes of work this gradual change or interlacing is desired, and it needs control in the same manner as the amount and depth of the true chill.

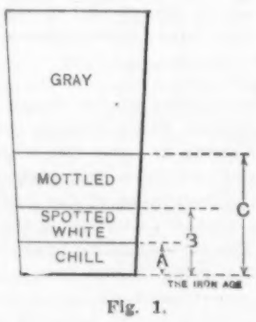

Fig. 1.

Adamson's Research Work.

The production of chilled castings has afforded a very favorable opportunity for the application of scientific methods. The chemist has been found to fill an important place, and the rule of thumb practices of earlier days have been largely replaced. It has also opened up a wide field for patient research work, and in this connection there recently appeared an important paper, which it is here purposed to review. It is on "The Influence of Silicon, Phosphorus, Manganese and Aluminum on the Chill in Cast Iron," by E. Adamson, and was printed in the *Journal* of the Iron and Steel Institute, November, 1906.

The methods adopted by Mr. Adamson were as follows: One hundred pounds of the metal experimented with was melted in two clay crucibles, in a coke fired, steel melting furnace. The molten iron was poured into a small ladle. A chill test was then poured and the temperature of the metal obtained with a Wanner optical pyrometer. After this a series of bars for mechanical testing was poured, and finally a second chill test, of which the temperature was also obtained. For the first few experiments both the Wanner and the well-known Le Chatelier pyrometers were used. The results checked so closely that the more convenient Wanner was used for the remaining tests.

The size of the chill test was 6 x 2 in. and 5 in. deep, tapering to 5½ x 1¾ in. The metal was poured on a heated steel block 3 in. thick. The results found may be taken up in the order of the element that was purposely varied.

Influence of Silicon.

The results are given in Table I. The transverse tests are the average of two, one piece being broken with the fin up, the other with the fin down. They were 3 ft. 6 in. long, cross section 1 x 2 in., and were placed edgewise on supports 3 ft. apart. The tensile pieces were tested as taken from the mold.

Table I.—Silicon Results.

	Analysis.							Chill tests.		Transverse tests.		Tensile test.
No.	Total carbon.	Gr. carbon.	Com. carbon.	Silicon.	Manganese.	Sulphur.	Phos. phorus.	Temperature. Centigrade.	Depth of true chill. Inches.	Pounds.	Deflection. Inches.	Pounds per square inch.
1	3.30	2.32	0.88	0.74	0.97	0.03	0.63	1,215	0.75	3,275	0.55	19,612
								1,187	0.75			
2	3.33	2.58	0.75	1.166	0.80	0.032	0.54	1,222	0.375	4,430	0.47	33,130
								1,187	0.125			
3	3.28	2.61	0.67	1.40	0.76	0.029	0.557	1,240	0.062	4,225	0.50	35,525
								1,187	0.062			

The effect silicon has in reducing the depth of chill is plainly brought out.

Influence of Phosphorus.

The results are shown in Table II.

Table II.—Phosphorus Results.

	Analyses.							Chill tests.		Transverse test.	
Number.	Total carbon.	Gr. carbon.	Com. carbon.	Silicon.	Manganese.	Sulphur.	Phosphorus.	Temperature. Centigrade.	Depth of true chill. Inches.	Pounds.	Deflection. Inches.
4	3.30	2.42	0.88	0.91	0.77	0.038	0.303	1,258	1.00	4,720	0.45
								1,236	0.875		
5	3.35	2.50	0.85	1.05	0.59	0.048	0.690	1,258	0.625	4320	0.42
								1,160	0.500		
6	3.32	2.54	0.76	0.98	0.62	0.054	1.075	1,258	0.375	3,875	0.32
								1,208	0.500		

It is seen that the phosphorus has a decided effect in reducing the depth of the true chill, and it would seem to have some influence in also reducing the percentage of combined carbon. With the increase in phosphorus the results of the transverse and deflection tests decrease.

Influence of Manganese.

These results are also given in tabular form, in Table III:

Table III.—Manganese Results.

Number.	Analyses. Total carbon.	Gr. carbon.	Com. carbon.	Silicon.	Manganese.	Sulphur.	Phosphorus.	Chill tests. Temperature. Centigrade.	Depth of true chill, inches.	Transverse test. Pounds.	Deflection, inches.
7	3.32	2.58	0.74	1.08	0.613	0.042	0.57	1,298	0.875	4,710	0.73
								1,215	0.500		
8	3.43	2.53	0.90	1.07	1.17	0.042	0.49	1,282	1.25	4,555	0.40
								1,194	1.00		
9	3.33	1.68	1.65	1.06	1.60	0.042	0.55	1,274	1.50	2,985	0.26
								1,229	1.25		
10	3.34	1.24	2.10	1.05	3.25	0.043	0.49	1,266	1.50	2,990	0.23
								1,207	1.00		

As may be readily seen, the manganese seems to have a direct influence in retaining the carbon in the combined form, and consequently increasing the depth of chill.

Influence of Combined Carbon and Casting Temperature.

The average time between the casting of the first and second chill tests was 2.66 minutes. This gave a good opportunity to ascertain the effect of the different initial temperatures on the depth of chill. The results are shown in Table IV, where is also seen the effect of the different combined carbon:

Table IV.—Influence of Carbon and Temperature.

	First chill.			Second chill.	
No.	Combined carbon.	Temperature. Centigrade.	Depth of true chill. Inches.	Temperature. Centigrade.	Depth of true chill. Inches.
3	0.67	1,240	0.062	1,187	0.062
2	0.75	1,222	0.375	1,187	0.125
6	0.76	1,258	0.375	1,208	0.50
5	0.85	1,258	0.625	1,160	0.50
1	0.88	1,215	0.75	1,187	0.75
4	0.88	1,258	1.00	1,236	0.875
7	0.74	1,298	0.875	1,215	0.50
8	0.90	1,282	1.25	1,194	1.00
9	1.65	1,274	1.50	1,229	1.25

It may be taken generally that the depth of chill is primarily dependent upon the percentage of combined carbon and the temperature of the casting.

Gradation of Chill Into Gray Iron.

The thickness and appearance of the transition layer between the chill and the gray iron showed marked differences. The results of the first chill tests are given in Table V, the meanings of the headings A, B and C to the columns being made clear by the accompanying Fig. 1.

Table V.—Gradation of Chill.

No.	Variable element. Per cent.	Depth to end of true chill. A. Inches.	Depth to end of spotted white. B. Inches.	Depth to end of mottled. C. Inches.	Fracture of gray back.
1	Si. 0.74	0.75	1.625	2.75	Hard gray.
2	Si. 1.166	0.375	0.75	1.00	Close grained gray.
3	Si. 1.40	0.062	0.18	0.43	Close grained gray.
4	P. 0.303	1.00	1.75	2.00	Hard gray.
5	P. 0.69	0.625	1.50	2.50	Hard gray.
6	P. 1.075	0.375	1.06	1.875	Hard gray.
7	Mn. 0.613	0.875	1.25	2.25	Hard gray, almost mottled.
8	Mn. 1.170	1.25	2.00	...	Above 2.00 mottle to top of test.
9	Mn. 1.60	1.50	2.50	...	Above 3.0 mottle to top of chill.
10	Mn. 3.25	1.50	4.00	...	Above 4.00 lower chill meets atmospheric chill from top.

The results obtained with the phosphorus pieces support Mr. West's statement that phosphorus makes the interlacing of gray and white very pronounced. They show that while the depth of true chill is reduced, the interlacing is rather increased than diminished.

Influence of Aluminum.

No mechanical tests were made with aluminum, simply three chills having been cast from each melt. The average analysis of the metal used for series A was:

Total carbon.	Gr. carbon.	C. C.	Si.	Mn.	S.	P.
3.67	2.82	0.85	0.98	0.29	0.11	0.05

The amount of aluminum added and the depth of the true chill are given in the first part of Table VI. The average analysis of the metal used for series B was:

Total carbon.	Gr. carbon.	C. C.	Si.	Mn.	S.	P.
3.23	trace.	3.23	0.933	0.36	0.022	0.16

The results are shown as follows:

Table VI.—Aluminum Results.

No. of series.	Amount of aluminum added. Per cent.	Depth of true chill. First. Inches.	Second. Inches.	Third. Inches.
Series A	None.	0.625	0.55	0.375
	0.5	0.500	0.625	0.375
	0.10	0.625	...	0.312
	0.40	trace.	trace.	trace.
Series B	None.	White iron, a little spotted near the top.		
	0.05	Mottled at top.	Less mottled.	1.125
	0.10		1.00	0.875
	0.20	0.625	0.625 to 0.375	0.500

The second series especially shows that, by the addition of aluminum, white iron is converted into gray and the chill is decreased in depth. The gray part of the pieces of each subdivision of three showed no difference in combined carbon, which is additional evidence as to the direct influence of the casting temperature on the depth of chill. C. B. W.

A Model Electric Car Testing Plant.

The new electrical laboratory of the Worcester Polytechnic Institute, Worcester, Mass., now in process of construction, which will be one of the largest in the world, will have an interesting plant for the study of electric railroad traction. The equipment of this department will consist of a motor generator set, a four-motor electric car equipment, a complete set of multiple unit control apparatus and complete airbrake equipment. The motor generator set is composed of a 300-hp. 2200-volt 60-cycle synchronous motor, mounted on the same base with and directly connected to a 200-kw. rotary converter, arranged to deliver either 600-volt direct current or 400-volt two-phase or single phase 25-cycle alternating current, as may be required. The machine will have an overload capacity of 50 per cent., so that either direct current at 500 or 600 volts or alternating current at 25 cycles will be available for use in the railroad laboratory up to the entire capacity of the institute's power plant, which will make possible the testing of the largest electric cars that are likely to be used in New England.

The car equipment consists of four motors of a combined capacity of 160 hp., with controllers, trolleys, switches, resistances, cables, &c., all of the latest type of the General Electric Company, and will be used for the motive power of the institute's test car, which will be of the modern interurban type, as large as will safely pass over the New England electric lines. The car will be equipped with instruments and apparatus for making exhaustive tests of the lines over which it passes, as well as for demonstrating various operating conditions. The multiple unit control apparatus is of the Sprague-General Electric type and is the same as used on the cars of the Boston Elevated, the New York Elevated and Subway and the suburban system of the New York Central. The control apparatus will be mounted in working order in the laboratory and will be so arranged that it may be used as control for the test car. A Westinghouse electric pneumatic unit switch control system will be installed, so that both systems may be studied and comparisons made under different operating systems. There will be a number of airbraking outfits of the several makes.

For the generating plant of the new Cunard steamship Mauretania, four Parsons turbo-generators are to be installed, each capable of furnishing 4000 amp. at 110 volts (440 kw. each). A large portion of the auxiliary machinery will be electric driven, in addition to which provision has been made for about 5000 lamps of 16 c. p. each. Electricity will be used for closing watertight doors, for operating searchlights and for telephones.

PERSONAL.

Raphael H. Wolff of New York, the representative in this country of the Héroult electric steel process, has returned from a brief trip to Europe. It was expected that Dr. Héroult would accompany him, but the doctor is confined to his bed as the result of a serious automobile accident.

George A. Berry, until recently engineer of company forces of the New York Central & Hudson River Railroad Company, has severed his connection with that company and has been elected vice-president and general manager of the Hicks Locomotive & Car Works, Chicago, Ill. Mr. Berry in his new capacity will have sole charge of the plants and business of the company and will make his headquarters in Chicago.

E. L. Hershey of Lancaster, Pa., has been appointed superintendent of Shenandoah furnace, at Shenandoah, Va., operated by the Alleghany Ore & Iron Company.

J. W. Duntley, president of the Chicago Pneumatic Tool Company, sailed for Europe November 6, for a five weeks' trip on the company's business, during which time he will visit the important trades generally in England, Scotland, France and Germany.

M. H. Richey has resigned as first vice-president of the Sloss-Sheffield Steel & Iron Company, the change becoming effective November 1. He was formerly connected with the Southern Railway and has now an offer from a railroad company under consideration. His successor has not been elected.

Charles A. McNair, president of the St. Louis Blast Furnace Company, St. Louis, Mo., celebrated his seventy-fifth birthday November 1, and his business associates made the occasion an event by presenting him with a handsome loving cup as a mark of their esteem. The presentation remarks were made by A. P. De Camp, one of the directors of the company. For nearly 40 years Mr. McNair has been engaged in the iron business. He began operating the Carondelet Iron Works in 1868, and in June, with several others, formed the Missouri Furnace Company. This enterprise was succeeded in 1897 by McNair & De Camp, and the business was carried on until June, 1900, when the St. Louis Blast Furnace Company was organized.

Robert L. Warner, for several years New England manager for the Westinghouse Electric & Mfg. Company, has resigned his position to enter the banking business as a member of the new firm of Warner, Tucker & Co., Boston. The position of New England manager of the Westinghouse Company will be abolished and D. Edgar Manson, who has been for three years manager of the Boston office, will have charge of the interests of the company in Boston, the scope of his duties being extended to include many of those which were attended to by Mr. Warner.

Charles G. Washburn, Worcester, Mass., founder of the Wire Goods Company, and formerly assistant secretary of the Washburn & Meon Mfg. Company, has been elected to Congress from the Third Massachusetts District.

M. K. McMullin has been elected president of the American Window Glass Company, Pittsburgh, and William L. Munro has been made general superintendent to succeed S. L. Bodine. Mr. McMullin is also president of the American Window Glass Machine Company.

Charles K. Cooper, who was chief engineer of the Mutual Life Company's buildings for 16 years, has resigned his position, and is now associated as consulting engineer with the American Air Compressor Works, 26 Cortlandt street, New York.

W. S. Allen, who has for some time been the superintendent of the Wheatland plant of the Sharon Foundry Company, Sharon, Pa., has resigned.

John E. Annis, president of the Chattanooga Roofing & Foundry Company, Chattanooga, Tenn., has been made president of the Chattanooga Manufacturers' Association, succeeding Robert Morrison. This is the leading commercial body in that city.

San Francisco Foundries Have Cheap Scrap.

SAN FRANCISCO, November 5, 1906.—The iron and metal scrap in the debris of the fire is now being gathered and removed to junk stores. It will be worth about $2,000,000 all told. The Palace Hotel yielded 75 tons, while some of the other large buildings furnished similar quantities. There will be no need of looking outside of the city for scrap for our foundries this year. There is enough at home, and unless there are large shipments East we will have all we want in the years that the city is rebuilding. Generally from 20,000 to 30,000 tons are gathered in this market in the course of a year, and sometimes there is so much on hand that it is exported. A couple of full cargoes have been shipped to Italy in the last few years. Scrap iron and steel of good quality used to command as good a price as pig iron and ingot steel, but there is quite a change in this respect now, as the average price per ton on cars is $10.50, with $9 for spot. That gives the local iron foundries a decided advantage over their Eastern competitors. Still the principal supplies of machinery, &c., for many months must come from the East.

The next year should be a very prosperous one in our industries. Besides the supplies needed for the rehabilitation work, there will be a vast amount of machinery required by the mines of Southern Nevada, which are now undergoing a wonderful development. The Stock Exchange in this city has started the past week to do a business in mining stocks that reminds one of the old days of the Washoe, the Comstock, and the Consolidated California and Virginia excitement. The sales on call here are 600,000 to 700,000 shares a day. The yield of the Southern Nevada mines for the present year is estimated at $20,000,000. Of course a great number of these mines are being carried on the reputation of the others, but making all due deduction it is plain that we have here one of the greatest gold fields of the world. It is estimated that over $50,000,000 of Eastern capital has been invested here quietly during the past few months. There are throughout these districts vast areas of unknown value, but this boom will cause developments and great quantities of machinery will be sold. Besides that there are various lines of hardware, &c., that can be introduced into the section by our San Francisco houses.

Trade in general is very good in all lines. Our hardware houses have no cause to complain, and though they have sustained serious losses by the fire they are recuperating rapidly. The insurance is being paid up much better than expected and the demand for goods from various sources is so great that the business as a whole has largely increased. This has been a good year in the country and large sales have been made by the retail trade. Farmers and orchardists have as a rule been prosperous and the spirit of improvement is abroad. There will be at least 50 per cent. more spent in improvements this year than last, not to speak of the larger trade resulting from the settlement of Eastern people which has been quite extensive. In a very little while the Southern Pacific has added 30,000 to the population of the State who have migrated hither from the older States. There is only one unsatisfactory feature to be mentioned, which is that only a little rain has as yet fallen. Good fall rains encourage the agriculturalist, the miner and the stockkeeper, who order more freely from the wholesale and jobbing trade. J. O. L.

The Buffalo Forge Company, Buffalo, N. Y., has received an order for a complete shop equipment to go to Sumatra, which includes 14 large forges in four different styles suitable for the various classes of work to be performed, which are to be equipped with the Buffalo down draft smoke exhaust system. The order also includes the necessary blower and exhaust for furnishing the blast and removing the smoke. The company has also received an order through its London office for large steel plate fans with self-aligning bearings and built of extra heavy material for use in a heating and ventilating system for the shops of the Belgian States Railways. This order includes four heavy down draft forges which will weigh in aggregate 3000 lb.

The Ingersoll-Rand Company's Statement.

Details have been published of the recent application to the New York Stock Exchange by the Ingersoll-Rand Company for the listing of $2,000,000 of 5 per cent. bonds, $4,500,000 of 6 per cent. cumulative preferred stock and $3,000,000 common stock. From the official statement the following abstract is taken:

The aforesaid bonds now issued and outstanding are of an authorized issue of bonds the amount whereof is limited to an aggregate principal sum of $3,000,000. The remaining bonds of this issue are reserved, and the proceeds thereof shall be used only for the acquisition by the Ingersoll-Rand Company of additional properties or additional buildings and machinery. All or any of the bonds are subject to redemption at 105 per cent. of the face value and accrued interest on any day after December 31, 1910, on which an installment of interest thereon shall mature and accrue.

The Ingersoll-Rand Company was organized under the laws of New Jersey June 1, 1905. The duration of the company is perpetual. Its authorized capital stock is $10,000,000, consisting of $5,000,000 preferred, of which $4,500,000 is now issued and outstanding, and $5,000,000 common, of which $3,000,000 is now issued and outstanding. The par value of each share is $100. At all elections of directors each holder of preferred or common stock shall be entitled to as many votes as shall equal the number of his shares of stock multiplied by the number of directors to be elected, and he may cast all of such votes for a single director, or may distribute them among the number to be voted for, or any two or more of them, as he may see fit.

Bonds of the par value of $2,000,000, 30,000 shares of common stock, and 45,000 shares of preferred stock, all the outstanding bonds and stock of Ingersoll-Rand Company were issued and delivered to acquire, and in full consideration for, the entire capital stock of two companies, which at the time of such purchase were engaged in the manufacture and sale of mining machinery, namely: The Ingersoll-Sergeant Drill Company, having factories at Phillipsburg, N. J., and Easton, Pa., and with a beneficial interest in the Hopatcong Water Company, a New Jersey corporation, all the capital stock of which is held in trust for the said Drill Company; and the Rand Drill Company, having a factory at North Tarrytown, N. Y., and through its ownership of the entire capital stock of the Imperial Engine Company, another factory at Painted Post, Steuben County, N. Y.; and also to provide for the satisfaction of a mortgage of the Ingersoll-Sergeant Drill Company upon its properties.

A brief description of the manufacturing plants of the Ingersoll-Rand Company is as follows:

Phillipsburg Plant.—The Phillipsburg plant comprises 199.27 acres of land, including 18 buildings, among which are pattern shop, smith shop, foundry, power house, drill manufacturing, compressor manufacturing and compressor erecting shops, storage and shipment buildings, with total floor space of 481,660 sq. ft., all equipped with modern tools and machinery for the manufacture of rock drills, coal cutters and air compressors. This plant is equipped with 24 electric traveling cranes, 1 locomotive crane, 1 yard locomotive and 7 flat cars, and has 4.31 miles of railroad track. The water works of the Hopatcong Water Company, previously referred to, supply this plant, and include a main reservoir with storage capacity of 33,000,000 gallons, about which reservoir 132 acres of surrounding land is held for the protection of the supply.

Easton Plant.—The Easton plant consists of 21½ acres of land with 12 buildings, having total floor space of 224,030 sq. ft. The plant includes smith shop, pneumatic tool, compressor manufacturing and compressor erecting shops equipped with the best modern tools and machinery for the production of pneumatic tools, electro-pneumatic drills, channeling machines and air compressors. The plant is further equipped with 4 electric traveling cranes, 1 yard locomotive, 2 flat cars, and has 1 mile of railroad track.

Tarrytown Plant.—The Tarrytown plant comprises 8 acres of land, with compressor shop, drill shop, storehouse, smith shop, power plant, power house and office, with total floor space of 80,000 sq. ft. The buildings are all equipped with modern tools and machinery for the production of air compressors and rock drills.

Painted Post Plant.—The Painted Post plant includes about 7 acres of land, upon which are erected the main factory, with other buildings, having total floor space of 60,000 sq. ft. The factory is equipped with modern tools and machinery for the production of air compressors.

Besides the manufacturing plants above mentioned the company has an investment of 693 shares out of a total of 1250 shares of the par value of $100 each of capital stock of the Canadian Rand Drill Company, located at Sherbrooke, province of Quebec, Canada, engaged in similar lines of production to that of the Ingersoll-Rand Company. The plant consists of 20 acres of land on the main line of the Canadian Pacific Railroad, with machine shop, pattern shop, pattern storage building, store house, smith shop and office building. A foundry is now in course of construction. The plant is equipped with improved machinery, tools and appliances for the manufacture of its product.

Dividends of three per cent. on the preferred stock were paid by the Ingersoll-Rand Company January 1, 1906 and July 1, 1906.

The by-laws of the company provide as follows:

Article IX—Sales of Stock.—Neither the Ingersoll-Rand Company nor any subsidiary company by it controlled shall speculate in the stock of either the Ingersoll-Rand Company or of any subsidiary company, or shall buy or sell the same, except in the regular course of the legitimate business of such company, or for the purpose of retirement; and this provision shall be unalterable save by the vote of the holders of three-fourths of each and every class of stock of the company voting thereon at a meeting called as provided in Article 1.

The following balance sheet of the Ingersoll-Rand Company shows the assets and liabilities of that company as of December 31, 1905, the close of the last fiscal year, and after the transfers of properties had been made:

Assets.

Capital assets:		
Real estate	$201,790.72	
Water supply	148,128.34	
Buildings	1,605,339.18	
Machinery	1,772,217.50	
Tools and jigs	319,062.50	
Patterns	119,724.02	
Drawings	126,856.63	
Furniture and fixtures	47,680.85	
Patents, licenses, &c.	615,144.35	
	$4,955,944.09	
Investments in foreign manufacturing companies	173,250.00	
Total capital assets		$5,129,194.09
Current assets:		
Inventories of raw materials, material in process, finished and consigned stocks	$3,400,955.35	
Accounts receivable	1,849,333.33	
Bills receivable	102,396.36	
Agents' balances	55,777.83	
Marketable stock and bonds	4,272.45	
Cash in bank	394,482.68	
Total current assets		5,807,218.00
Total		$10,936,412.09

Liabilities.

Capital liabilities:		
Capital stock:		
Preferred stock and scrip	$4,500,000.00	
Common stock and scrip	3,000,000.00	
		$7,500,000.00
Bond certificates		2,000,000.00
Total capital liabilities		$9,500,000.00
Current liabilities:		
Accounts payable	$653,736.99	
Bills payable	240,000.00	
Interest accrued on bond certificates	50,000.00	
Preferred stock dividend (payable January 1, 1906)	134,685.00	
Total current liabilities		$1,078,421.99
Depreciation fund		180,566.53
Profit and loss account		177,423.57
Total		$10,936,412.09

The officers of the company are: William L. Saunders, president; George Doubleday, first vice-president; Jasper R. Rand, Joseph P. Grace, George R. Elder and J. S. Phipps, vice-presidents; William R. Grace, treasurer; Fred A. Brainerd, secretary.

Regarding the value of the exponent n in the expression $p\ v\ n$ = constant, it has been pointed out that this value may safely be taken at 1.3 for the compression curve of a gas engine indicator diagram, and 1.35 for the expansion curve. This is quite at variance with the value 1.41, usually heretofore accepted or this exponent.

NEWS OF THE WORKS.

Iron and Steel.

The Mesta Machine Company, Pittsburgh, through its Birmingham, Ala., representatives, Shook & Fletcher, has taken a contract for the heavy rocker castings and other steel castings for the four new open hearth furnaces the Tennessee Coal, Iron & Railroad Company is building at its Ensley plant. The same company has the contract for the hydraulic cylinders for tilting the new furnaces.

At Birmingham, Ala., the court has confirmed the sale of the property of the Lookout Mountain Iron Company, Battelle, Ala., to Charles A. Stevens of Cincinnati, representing the bondholders. The property cost over $1,000,000. There was an issue of $500,000 of bonds, which were used as collateral for loans made by the company. These loans were renewed, and the creditors claim that at the time of the last renewal the company was insolvent, so that the bonds held by the First National Bank of Cincinnati and others were in effect a preference. Litigation has been begun against the bondholders and others, and it is not likely that the furnace will be started at an early day.

The plant of the John A. Roebling's Sons Company at Kinkora, near Trenton, N. J., is about completed, and the mills are expected to be placed in operation within the next few days.

The Nova Scotia Steel Company, Sydney Mines, Nova Scotia, blew out its blast furnace November 1 for relining. This was the furnace's first blast, and it made 125,000 tons of basic and foundry iron. The open hearth steel department of this company will shortly close down for about a month. It has three 40-ton furnaces and a mixer and produces 6000 tons of steel per month.

The stack of the St. Louis Blast Furnace Company, St. Louis, Mo., which has been idle for nearly three months undergoing extensive repairs, has been blown in. A fourth stove has been added of greater capacity than either one of the three that have served the plant since construction. A new bin system, together with elevated tracks, has also been installed, and a new stock house has been erected. The furnace was given a new bosh and was partly relined. The production will be increased approximately 25 per cent. by these improvements, and it is expected that the output will average 200 tons daily. The DeCamp Brothers & Yule Iron, Coal & Coke Company, St. Louis, is the sole agent of the iron produced by this furnace.

The Greer and Shenango works of the American Sheet & Tin Plate Company at New Castle, Pa., will be closed down this week and possibly next week, for lack of fuel. During the shutdown some repairs will be made.

The Rebecca Furnace at Kittanning, Pa., was blown out October 23 for repairs.

No. 2 furnace of the La Belle Iron Works, Steubenville, Ohio, was blown in October 23.

The Susquehanna Iron & Steel Company, Columbia, Pa., expects to have one furnace in blast in about 60 days.

The Earlston Furnace, Earlston, Pa., was blown in November 3.

General Machinery.

Among large orders recently received by the Buffalo Forge Company, Buffalo, N. Y., are the following: Lake Shore Engine Works, Marquette, Mich., 40-in. steel plate fan direct connected to engine; W. S. Barstow Company, New York, 170-in. fan with water cooled bearings, direct connected to 8 x 10 in. automatic engine; General Electric Company, Schenectady, N. Y., five 40-in., two 45-in., one 50-in. and two 55-in. special steel plate fans; Leland Stanford University, San Francisco, Cal., forge shop equipment, including 25 down draft hoods, 60-in. fan and No. 7 B volume blower; Emery College, Oxford, Ga., two 110-in. steel plate fans, 8 x 8 in. single vertical double acting engine with its new design open frame and other apparatus for heating and ventilating a gymnasium; Central Stamping Company, Newark, N. J., 100-in. fan and 5½ x 7 in. direct connected engine; Erie Railroad Company, heating equipment for roundhouse and machine shop at Susquehanna, Pa.; and heating and ventilating apparatus for the following: Geophysical Laboratory, Carnegie Institute, Washington; Keystone Watch Company, Philadelphia, Pa.; J. J. Howden Company, Muskegon, Mich.; Hood Furnace & Supply Company, Corning, N. Y.; Electric Wheel Company, Quincy, Ill.

The Ruggles-Coles Engineering Company, New York and Chicago, reports the following sales of drying machines during the month of October: Three for the Oklahoma Portland Cement Company, Ada, I. T.; one, Chicago Portland Cement Company, Oglesby, Ill.; six, Iowa Portland Cement Company, Mason City, Iowa; six, Dixie Portland Cement Company, Bridgeport, Tenn.; two, Almendares Portland Cement Company, Havana, Cuba; three, Pennsylvania Portland Cement Company, Bath, Pa.; one, Empire Gypsum Company, Garbut, N. Y.; one, Continental Graphite Company, and one, United States Graphite Company, Byers, Pa.

The Street Bros. Machine Works is the name of a new company chartered at Chattanooga, Tenn. The incorporators are Joseph, J. H. and W. C. Street, Claude H. Huston and Z. W. Wheland.

The Toronto, Hamilton & Buffalo Railway Company, Hamilton, Ont., whose shops were recently destroyed by fire, intends to rebuild but has not yet completed the plans. It is not likely that any new machinery will be required, as the old is but little damaged.

L. F. Grether & Co., Allentown, Pa., have opened a machine shop completely equipped for the repairing of all kinds of pumps, engines and machinery. The firm consists of Lewis F. Grether and James P. Culbertson.

The Solid Steel Tool & Forge Company, Brackenridge, Pa., is doubling its die sinking capacity by the addition of new machinery. This has been made absolutely necessary in order to meet its increased hammer capacity. The company will be able to make much quicker delivery on orders for forgings where new dies are needed to get out the work. It is also increasing its force of machinists in order to keep up repairs needed by the increased volume of business on its various lines of forging machinery.

The Alliance Machine Company, Alliance, Ohio, is very busy and has a large amount of business booked ahead. Last week the company shipped a large electric stripper to the Pennsylvania Steel Company, Harrisburg, Pa.; two 20-ton cranes to the Republic Iron & Steel Company, Ensley, Ala., and seven carloads of machinery for the new plant of the Vermillion Iron & Steel Company, Sidney, Nova Scotia.

The Eyre-Shoemaker Construction Company has purchased a site of 12 acres of ground on the Pennsylvania Railroad at Tipton, Pa., near Tyrone, and will start at once the erection of large machine and repair shops. The main building will be of structural steel, and will be 70 x 300 ft., and, with the boiler house, will be completed by the first of the coming year. Other buildings will be started in the spring. At this new plant the company will build and repair machinery that is in use on the many large railroad construction contracts that the company has in all parts of the State.

The McClary-Jemison Company, Birmingham, Ala., has moved into the building, 2201 Morris avenue, where it has ample room for the display of machinery manufactured by the various companies it represents.

The Reliance Machinery & Supply Company, Chicago, has been incorporated by Almon W. Bulkley, C. H. Hartman and Clair E. More. The capitalization is $25,000.

Andrew Dressendorfer, manufacturer of and dealer in machinery, wagons and plows, Fountain City, Wis., whose plant was recently totally destroyed by fire, has erected a two-story brick factory, 70 x 100 ft. The machinery equipment for the building was purchased through Robinson & Cay, St. Paul, Minn., and includes the following: One 24-in. x 14-ft. New Haven lathe, one No. 20 Smith & Mill shaper, one Barnes lathe, one Canedy-Otto drill, one Barnes drill press, one Silver Mfg. Company's band saw. The machinery is driven by electric power furnished by a Westinghouse motor and the equipment also includes a large steam hammer.

Power Plant Equipment.

The Enterprise Boiler Company, Youngstown, Ohio, advises us that the report that it had sold out its business to some Illinois capitalists is untrue. Its plant at Youngstown was burned some months ago, and since that time the company has been operating the plant of the Girard Boiler Company, Girard, Ohio, under lease.

The City Council of Columbus, Ohio, has decided to sell $140,000 of bonds to repair and equip the electric light plant owned by the city. It is stated that it costs $80,000 a year to operate the plant and that it has been a losing proposition since it was first placed in operation.

The Watertown Light & Power Company, Watertown, Tenn., is to erect an electric light and power plant, the equipment for which, including a 75-hp. Corliss engine, 60-kw. generator, 100-hp. water tube boiler, has been purchased. A large wood working plant will be installed and operated in connection with the power plant. W. L. Goodhart is president.

Recent sales of the Crocker-Wheeler Company, Ampere, N. J., include among others, Pittsburgh & Conneaut Dock Company, Conneaut Harbor, Ohio, 50-kw. generators; Eaton, Cole & Burnham Company, Bridgeport, Conn., 200-kw. generator; Midvale Steel Company, Philadelphia, Pa., one 275 and one 325 hp. motor; National Tube Company, McKeesport, Pa., three 75, fourteen 30 and nineteen 6 hp. motors; Brown & Bigelow, St. Paul, Minn., 65-kw. generator; Keller Pike Company, Esopus, N. Y., two 35-kw. generators; William Anderson, Philadelphia, Pa., two 50-kw. generators.

The Negociacion Minera Santa Maria de la Paz y Anexas of Natchuala, has ordered of G. & O. Braniff & Co., City of Mexico, who are agents for Mexico of the Westinghouse Electric & Mfg. Company and the Westinghouse Machine Company, both of Pittsburgh, Pa., an ideal steam-driven electric plant, to be installed at its mines. The electric power will be used to drive a multi-stage Byron-Jackson centrifugal pump built by the Byron-Jackson Machine Works, San Francisco, for which company Braniff & Co. are also agents. This one pump will deliver 150 gal. per min., against a total static head of 1640 ft. This is stated to be the greatest head against which a single centrif-

ugal has ever been operated in Mexico and indicates the rapid advancement which is taking place in this type of pump manufacture, which is proving so well adapted to mining work. This pump is driven by and directly coupled to a Westinghouse 150-hp. alternating current motor making 1700 rev. per min. The generating plant consists of a Westinghouse compound 16 x 27 x 16 in. steam engine, which drives a 140-kw. three-phase, 440 volt, 7200 alternation generator.

The Colorado Light & Power Company, Canon City, Col., which is enlarging its plant, is installing 2400-hp. Babcock & Wilcox boilers, together with an 850-kw. steam turbine unit of the Parson's type and condensing apparatus of the Alberger Company. The steam end of the extension is being equipped with sufficient capacity to put an additional 850-kw. unit in when required. An extension to the boiler room will be made, 54 x 105 ft., and to the engine room, 44 x 45 ft. The transformer room will also be extended 27 x 40 ft. The present plant consists of three 500-kw. units, direct connected to cross compound engines. The company supplies electric power throughout the Cripple Creek mining district and also lights the towns in this district, as well as supplying light and power in Canon City and Florence and the mining coal camps in the Arkansas Valley.

Foundries.

The Barry & Zecher Company, Lancaster, Pa., has just started operating its new iron foundry. The building is a steel structure with brick walls, 55 x 225 ft. and is equipped with every modern appliance for the making of iron castings of from 50 to 12,000 pounds weight each. The foundry will produce castings for iron and steel rolling mills, and all machine purposes, to order. Prices will be quoted from drawings to furnish castings either in the rough or machined, and to include patterns, if wanted.

The Ayres Syndicate Company, Joplin, Mo., intends to erect a foundry and machine shop in the near future.

I. Levinstein & Co., Davenport, Iowa, dealers in scrap iron, steel, metal, &c., intends to erect a plant for the manufacture of small cast iron pipe, 3 and 4 in., and gray iron castings. As it is a little late in the season to begin, the firm intends to commence building about March 1 of next year. The plant will consist of a foundry, 100 x 200 ft. with an addition, 40 x 60 ft., to be used as a pattern shop, and a building, 20 x 40 ft., for core making. The Ashtabula Company, Ashtabula, Ohio, will increase its plant by the erection of a molding shop, 84 x 130 ft. It will occupy the site of the warehouse which is to be moved across the street.

Bridges and Buildings.

The Ritter-Conley Mfg. Company, Pittsburgh, Pa., has received the contract for the erection of the building for the main plant of the Petroleum Iron Works, Sharon, Pa.

The New York State Steel Company, Buffalo, N. Y., has awarded the contract to the Wm. B. Scaife & Sons Company, Pittsburgh, Pa., for a large steel frame building to be used as a machine and general repair shop.

Fires.

The plant of the South Baltimore Car & Foundry Company, Baltimore, Md., was damaged $10,000 by fire on November 3.

The packing house of Rosenberg Brothers, San Jose, Cal., was burned November 10, the loss being about $50,000.

The window glass plant of the Keystone Company, at Corry, Pa., was destroyed by fire November 9. The loss is placed at $50,000.

A fire in buildings on Beverly Street, Boston, November 10, caused the destruction of a number of establishments, among them those of James W. Madden, marble tool maker; Torreys & Co., marble workers; Aronson Bros., manufacturers of spring beds; and the Firestone Tire & Rubber Company. The total loss was about $100,000.

The plant of the Columbia Brewing Company, Jersey City, N. J., was destroyed by fire November 12, the loss being about $100,000.

Hardware.

The W. S. Burn Mfg. Company, New Haven, Conn., manufacturer of metal goods, announces that it will retire from business. The company occupies what is known as the Housatonic Mfg. Company building.

The Stewart Iron Works Company, Cincinnati, Ohio, owing to the large increase in the demand for its iron fencing, is erecting an addition to its already extensive plant, 100 x 100 ft., two stories in height, brick, which will enable the company to employ from 75 to 100 additional men. The building is expected to be completed by February 1, next. One of the latest contracts secured by the company for iron fencing is for 12,000 feet 6 ft. fencing for the Insane Asylum at Columbus, Ohio.

The Bostrom-Brady Mfg. Company, Atlanta, Ga., is having a lively demand for the Bostrom improved farm and builders' levels, not only from the different States, but also from foreign countries. In addition to manufacturing levels, the company is open to make estimates on the manufacture for others of mechanical specialties in brass and steel.

The Brantford Screw Company, Brantford, Ont., has about placed all its orders for machinery and expects to be ready to operate its new plant within the next two weeks. Its power plant consists of two 125-hp. gas engines to be operated with natural gas. The new machinery that is being installed, together with the power plant, including shafting, pulleys, &c., for transmission, will cost approximately $100,000. This in connection with the machinery in the old plant will give a large output of bolts, rivets, nuts and screws, the capacity of bolts alone when in full operation being 250,000 per day.

Miscellaneous.

The Niles Car Mfg. Company, Niles, Ohio, has recently received orders for cars from the Youngstown & Southern and the Youngstown & Ohio River electric lines.

The Wheeling Can Company, Wheeling, W. Va., is building an addition 72 x 186 feet, to its plant.

The machinery is now being installed in the new plant that the Ohio Electrical Mfg. Company is building at Alliance, Ohio, and it will be in operation by the middle of December. All kinds of electrical appliances and equipment will be manufactured and 150 men will be employed.

The James A. Spargo Wire Company, Rome, N. Y., has purchased 12 acres of ground upon which it will erect a building, 150 x 400 ft. The company will not be in the market for equipment until next summer, but at that time it expects to purchase a 450-hp. engine and generator and sufficient boiler capacity.

The American Forged Wheel Company is building an addition to the plant at New Castle, Pa. The new building will be of brick, and will be used as a tool shop and storage warehouse.

The Irons & Russell Company, Providence, R. I., manufacturing jewelers, is to erect an addition to its works, to be used for powerful machinery for stamping up heavy jewelry.

D. F. Freeman & Co., Stamford, Conn., paint manufacturers, are to erect two new buildings, one 94 x 120 ft., one and three stories high, the other 40 x 278 ft.

The Kiesel Fire Brick Works, Rochester, N. H., is to rebuild its works which were destroyed by fire last spring. The main building will be 60 x 102 ft., with annex 35 x 58 ft., all two stories. The boiler house, 30 x 35 ft. is finished. When the plant was burned it was rushed to full capacity, with three months' orders ahead. G. M. Goodwin is president, and W. E. Turner, treasurer.

The Ever-Ready Fire Extinguisher Company has been incorporated at Buffalo, N. Y., with a capital stock of $100,000, to manufacture fire extinguisher apparatus and equipment, by George H. Draper, John H. Costello and Charles Brent.

The Spencer Kellogg Company, linseed oil producer, Buffalo, N. Y., has purchased the Coatsworth elevator, 750,000 bu. capacity, adjoining its present mills and elevator on the Buffalo river, and will erect on vacant property acquired with the elevator a new linseed oil mill, with a capacity of 48 presses. The new mill will be operated by Niagara Falls power.

The Auto-Pump Company has been incorporated at Springville, N. Y., with a capital of $10,000, to manufacture patent automatic action pumps, by Ralph B. White, Samuel E. Spencer and Lamont Shultes.

The H. E. Wilcox Motor Car Company, Minneapolis, Minn., has been incorporated with a capital stock of $100,000 by J. F. Wilcox, H. E. Wilcox, Maurice Wolfe and R. D. Wilcox. The company has for some time operated a machine shop and foundry, doing considerable work in the line of automobile repairing, and the object of the incorporation is to go into the manufacture of automobiles. The company will use the Carrico air-cooled engine, sliding gear transmission with the side chain drive and Timken roller bearings throughout. One of the main features of the car will be that it will have a 16-inch clearance, which will adapt it to Western roads, and the full elliptic springs which will make it an easy riding car. Facilities of the plant provide for making at least 100 cars for the coming season, and improvements will later be made which will increase the capacity as occasion demands.

The Manitoba Gypsum Company, Winnipeg, Manitoba, is erecting a new mill which will have a capacity of 50,000 tons a year and will cost $100,000. The company was formed in the fall of 1904 and until this spring had a plaster mill at the north end of Lake Manitoba, about 100 miles north of Winnipeg, near its gypsum quarries. This mill was burned down last July and the new plant is being built at Winnipeg, the raw material being brought down from the quarries. The Canadian Railway Company is building a branch from its system to the quarries and this will be completed next year. The demand for hard wall plaster has grown to be very large since its introduction from the United States a few years ago and is rapidly increasing.

The Triumph Motor Car Company, Cragin, Ill., has been incorporated with a capital of $25,000 to manufacture automobiles, as well as a self-starting gasoline engine for automobile service. The officers are: George H. Behrens, president; Max Lau, vice-president, and Carl F. Pearson, secretary and superintendent. The Company's new plant will be equipped

with six engine lathes, a 24-inch Davis turret chucking, boring and facing lathe, Norton universal grinder, three drill presses, one monitor lathe, cylinder grinder, speed lathes, as well as miscellaneous small tools, contracts for which have already been placed with a Chicago machinery house.

The Davis Mfg. Company, Milwaukee, Wis., reports an order from the Westinghouse Machine Company, East Pittsburgh, Pa., for micrometer calipers and also from the Connersville Blower Company for one of these calipers to measure 126 inches. The company also has a contract to supply the Weston-Mott Company, Utica, N. Y., with steel bins for its new factory at Flint, Mich.

The American Spiral Spring & Mfg. Company, Pittsburgh, has completed its new works at Fifty-sixth and Butler streets, which it is now occupying. Its offices are also located there.

The Indiana Brass & Bronze Company, manufacturer of brass and bronze castings, which was recently incorporated at Indianapolis, has its headquarters at Marion, Ind.

The Penn Reduction Company, Philadelphia, Pa., is to rebuild its plant, which was recently destroyed by fire, and will require considerable apparatus for its equipment. The main building, 80 x 160 ft., is to be erected and two additional buildings, each 20 x 100 ft. The buildings are to be made fireproof and to be equipped with 64 15-ton steel digesters and 16 20-in. hydraulic presses. The company uses 16 6 x 18 ft. boilers.

The Union Switch & Signal Company, Pittsburgh, announces that it has abandoned the manufacture of torpedoes for the torpedo machine it makes for use on railroads. This branch of business has been turned over to the Versailles Railway Signal Company, Versailles, Pa., now manufacturing all kinds of railroad torpedoes. The Union Switch & Signal Company will continue to make the torpedo machines.

The Associated Foundry Foremen of Philadelphia and Vicinity.

The regular monthly meeting of the Associated Foundry Foremen of Philadelphia and Vicinity was held in that city, Monday evening, November 12, at which the following officers were elected to serve for the ensuing year: President, W. A. Perrine, Abram Cox Stove Company, Philadelphia; vice-president, E. H. McCoy, Stanley G. Flagg Jr. & Co., Philadelphia; secretary, W. P. Cunningham, American Bridge Company, Pencoyd, Pa., and treasurer, George M. Benkert, Fairmount Foundry Company, Philadelphia. Adam Pugh, of I. A. Sheppard & Co., was also elected for the regular term as trustee.

The Committee on Entertainment for the reception of the Associated Foundry Foremen, which organization will meet in convention with the American Foundrymen's Association in this city next year, was announced as follows: W. O. Steel, Bateman Mfg. Company, Grenloch, N. J., chairman; H. W. Creamer, Wm. Adams Foundry Company, Philadelphia; John Alexander, Harrison Safety Boiler Works, Philadelphia; George M. Benkert, Fairmount Foundry Company, Philadelphia; Wm. E. McCleary, Crompton Knowles Loom Works, Philadelphia; George Moyer, Enterprise Mfg. Company, Philadelphia; J. B. Strain, Robert Wetherill & Co., Chester, Pa.; Edward T, Spuar, Enterprise Mfg. Company, Philadelphia; F. G. Smith, Midvale Steel Company, Philadelphia; W. A. Perrine, Abram Cox Stove Company, Philadelphia; Adam Pugh, I. A. Sheppard & Co., Philadelphia, and C. R. Brown, E. E. Brown & Co., Philadelphia.

The meeting was well attended and the principal subject for the evening's discussion was on the manufacture of light gray iron and stove castings, which was entered into by a number of those present.

The Rothe Erde Strike.—To the German steel industry the strike at the Aachener. Huetten Verein at Rothe Erde, near Aix-la-Chapelle, possessed a significance far beyond its local effect. It was an effort on the part of labor organizers to secure a foothold in the iron industry of Westphalia and the Rhine, the Rothe Erde works being selected for a test of strength because of its isolated location with reference to the main districts. A demand for a sharp advance in wages was made July 16, coupled with some minor regulations. On August 2 the management announced that the entire plant would be shut down on the 7th unless the men receded, and they were accordingly locked out. They remained idle until October 18, when a conference resulted in resumption at the terms of the company.

OBITUARY

EDWARD FULLERTON MILLIKEN died November 10, at the New York Hospital, where he had recently undergone an operation for appendicitis. He was vice-president and a director of Milliken Bros., Incorporated, New York. From his youth Mr. Milliken was prominent in the iron and steel business in this country. In 1879 he was admitted into partnership in his father's business, and from 1887 he and his brother, Foster Milliken, continued the business alone, until January of this year, when it was incorporated under the above name. For many years the firm represented the Phœnix Iron Company in this vicinity. Mr. Milliken was an earnest, active worker, and kept in close and sympathetic touch with his employees, who esteemed him highly. About the time the corporation commenced the construction of its new steel plant on Staten Island, now in operation, he resigned the presidency of the company in favor of his brother Foster, who for the past few years has had under his more immediate direction the general management of the business. Mr. Milliken was a civil engineer and a member of many clubs and societies, among them being the Metropolitan Museum of Art, the City Midday Club, the Municipal Art Society, the Chamber of Commerce, the Lawyers' Club, the University Club, the Racquet Club, the Larchmont Yacht Club and the Union Club. He was in his forty-fourth year.

HENRI DE WENDEL, the head of the great firm of de Wendel, iron and steel makers, of Lorraine and France, died October 12. He was born in 1844 and took charge of the interests of the firm in 1870. In 1900 he was accorded the Bessemer medal by the Iron and Steel Institutee in recognition of his services to the steel industry.

JOHN R. BLAKESLEE, president of the Ajax Mfg. Company, Cleveland, Ohio, died November 9 from Bright's disease, aged 63 years. For more than 25 years he had been prominently identified with manufacturing interests in Cleveland. He was born in Winsted, Conn., and enlisted in the Union army at the outbreak of the Civil War. He served through the entire struggle, and after the close of the war moved to Indianapolis. After a short residence in that city he went to Youngstown, and afterward to Cleveland, where he engaged in the machinery business and soon afterward founded the Ajax Company, which has become prominently known in the machinery trade. His son, John R. Blakeslee, Jr., has of late years been actively in charge of the business.

Owing to the poor character of the coal supplied to the Dominion Iron & Steel Company by the Dominion Coal Company the former banked its three blast furnaces at Sydney, N. S., on November 1. The company is being placed in an unsatisfactory position in its endeavor to secure fuel for the Otto-Hoffman by-product ovens, of which it has 400. It appears that although the Dominion Coal Company has low phosphorus coal it insists on sending a grade to the Dominion Iron & Steel Company which contains a high percentage of sulphur and in consequence makes a very sulphurous coke. The steel company has enough pig iron to run for some weeks, after which it may be necessary to shut down its open hearth steel plant as well as its wire rod and steel rail mills.

The Wheeling Board of Trade, Wheeling, W. Va., has issued a 36-page illustrated pamphlet giving a large number of views about the city and a great variety of information concerning it covering its commerce and manufactures, its fuel and transportation facilities and including a list of the products manufactured in the city. The list of such products is a long one and covers a wide range of industries. A portion of the publication is devoted to a statement of what the Wheeling Board of Trade has done in promoting the commercial and manufacturing development of the city.

Germany produced 14,937,000 metric tons of coke in the first nine months of this year, against 10,874,000 tons in the corresponding period of last year.

Pig Iron Production Sharply Increased.

October Makes a New Record at 2,196,808 Tons.

With a tremendous spurt for records in October, the coke and anthracite blast furnaces of the country reached a new high mark in that month, with a total of 2,196,808 tons. This is 31,000 tons in excess of the greatest previous record, made in March of this year—2,165,632 tons. Adding the production of the charcoal furnaces of the country, about 35,000 tons, and the total for October is above 2,230,000 tons, or at a rate quite in excess of 26,000,000 tons a year. The steel companies contributed the greater part of the increase over September, their production in October exceeding that of September by 187,820 tons, while the merchant furnaces made a gain of 38,026 tons. The number of furnaces active on November 1 was 313, as against 310 on October 1.

The table below gives the production of the coke and anthracite furnaces in October, as compared with the record for the preceding four months:

Monthly Pig Iron Production.—Gross Tons.

	June. (30 days)	July. (31 days)	August. (31 days)	September. (30 days)	October. (31 days)
New York	129,834	141,885	138,697	140,105	139,868
New Jersey	32,858	34,814	35,058	34,849	32,297
Lehigh Valley	49,704	51,761	51,979	50,946	51,224
Schuylkill Val.	56,921	52,751	47,940	48,245	50,375
Lower Susquehanna and Lebanon Val.	60,210	61,132	64,145	63,968	65,231
Pittsburgh dis.	487,900	505,570	457,002	460,903	567,662
Shenango Val.	157,313	150,116	133,984	138,843	150,019
West. Penn.	100,505	103,733	94,874	98,237	116,588
Md., Va. and Kentucky	75,016	73,888	77,647	78,654	89,280
Wheeling dis.	93,618	101,573	107,526	102,364	112,022
Mahoning Val.	149,943	161,073	136,415	149,635	186,983
Central and North. Ohio	149,944	147,162	155,455	152,730	149,339
Hocking Valley and Hanging Rock	33,559	31,643	34,276	31,383	33,753
Ill., Mich., Minn., Wis., Mo. and Colo.	236,528	232,954	218,725	244,403	264,966
Alabama	124,606	127,165	130,771	132,554	143,254
Tennessee, No. Caro., Texas and Georgia	38,265	36,182	42,242	43,143	43,947
Totals	1,976,733	2,013,402	1,926,736	1,970,962	2,196,808

To each of the above totals should be added about 35,000 tons, representing the monthly output of the charcoal furnaces, of which monthly statistics are not gathered.

Production of Steel Companies.—Returns from all the plants of the United States Steel Corporation, the Cambria, Pennsylvania, Maryland, Lackawanna, Wheeling, Republic, Jones & Laughlin, La Belle, Bethlehem, Calumet and Colorado companies show the following totals of products month by month. We present also separately monthly figures of the production of spiegeleisen and ferromanganese, which is included in the total:

Production of Steel Companies.—Gross Tons.

	Pig.—Total production.—			Spiegeleisen and ferromanganese.	
	1904.	1905.	1906.	1905.	1906.
January	502,994	1,129,042	1,358,015	21,002	26,305
February	756,260	1,027,937	1,226,760	22,431	26,988
March	913,412	1,232,255	1,400,395	21,280	23,595
April	974,006	1,222,710	1,333,591	20,038	28,054
May	927,534	1,287,438	1,372,423	24,732	29,447
June	788,882	1,149,404	1,293,437	21,761	22,737
July	694,892	1,114,409	1,323,391	31,220	20,153
August	747,570	1,186,050	1,237,485	27,461	18,327
September	936,494	1,262,033	1,264,380	21,645	24,078
October	971,447	1,370,960	1,452,200	26,799	23,517
November	962,384	1,334,644	.....	23,776	.....
December	1,019,841	1,356,962	.....	29,481	.....

Among furnaces blown in in October were Niles and the new No. 2 Haselton in the Mahoning Valley, one Swede in the Schuylkill Valley, Keystone of the Thomas Iron Company in the Lehigh Valley, one Shoenberger and one Monongahela in the Pittsburgh District, Gem in Virginia, one Sparrow's Point in Maryland, one La Belle in the Wheeling District, Newburgh in the Cleveland District. Among furnaces blown out we mention one Hokendauqua of the Thomas Iron Company in the Lehigh Valley, Franklin in New York, one Crane in the Lehigh Valley, Rebecca in western Pennsylvania, one Steelton in the Susquehanna Valley, one Lorain in Ohio and one Rockwood in Tennessee.

The table below gives the active capacity per week of furnaces producing coke and anthracite iron on November 1 and October 1, 1906:

Coke and Anthracite Furnaces in Blast.

Location of furnaces.	Total number of stacks.	November 1. Number in blast.	November 1. Capacity per week.	October 1. Number in blast.	October 1. Capacity per week.
New York	13	13	26,593	13	27,532
Other New York	10	4	4,741	5	5,220
New Jersey	8	7	7,112	7	7,964
Spiegel	2	1	182	1	167
Pennsylvania:					
Lehigh Valley	23	16	10,682	17	10,288
Spiegel	3	3	882	3	670
Schuylkill Valley	13	12	11,746	11	11,257
Low. Susquehanna	8	4	7,381	5	7,009
Spiegel	2	1	266	1	631
Lebanon Valley	10	10	7,084	9	6,696
Spiegel	1	0	0	1	590
Pittsburgh District	43	43	126,147	41	107,677
Spiegel	2	2	2,037	2	2,354
Shenango Valley	20	18	33,905	18	34,696
West. Penn.	24	17	25,515	18	22,863
Maryland	4	3	8,169	3	7,049
Spiegel	1	1	133	0	0
Wheeling District	14	14	26,761	13	23,885
Ohio:					
Mahoning Valley	17	17	42,239	15	37,046
Central and North. and Michigan	20	19	35,909	19	39,025
Hocking Valley and Hanging Rock	12	12	7,623	12	8,112
Illinois	21	20	46,199	20	43,089
Spiegel	3	2	1,813	2	1,276
Minnesota	1	1	1,243	1	1,252
Wisconsin	5	5	5,044	5	4,985
Missouri	1	0	0	0	0
Colorado	4	4	6,779	4	6,032
Spiegel	1	0	0	0	0
The South:					
Virginia	23	14	9,328	13	9,218
Kentucky	7	4	2,871	4	2,718
Alabama	46	30	32,277	30	30,848
Tennessee	18	14	8,883	15	8,970
Georgia and Texas	2	2	1,036	2	1,136
North Carolina	1	0	0	0	0
Totals	383	313	500,580	310	470,255

For a series of months the active coke and anthracite capacity fluctuated as follows, in gross tons:

	Capacity per week.		Capacity per week.
November 1	500,580	May 1	368,244
October 1	469,665	April 1	337,257
September 1	441,426	March 1	308,751
August 1	449,908	February 1	273,692
July 1	460,570	January 1, 1904	185,636
June 1	472,622	December 1, 1903	244,156
May 1	484,031	November 1	273,715
April 1	484,240	October 1	353,142
March 1	479,737	September 1	360,197
February 1	482,156	August 1	353,681
January 1, 1906	463,673	July 1	384,825
December 1, 1905	475,814	June 1	388,178
November 1	460,449	May 1	373,496
October 1	445,468	April 1	386,215
September 1	412,563	March 1	347,424
August 1	410,088	February 1	335,239
July 1	408,617	January 1, 1903	346,073
June 1	443,092	December 1, 1902	336,617
May 1	452,031	November 1	330,110
April 1	439,564	October 1	337,837
March 1	403,157	September 1	328,243
February 1	405,792	August 1	328,745
January 1, 1905	377,879	July 1	303,793
December 1, 1904	357,846	June 1	337,492
November 1	334,249	May 1	337,627
October 1	319,249	April 1	331,140
September 1	291,573	March 1	316,039
August 1	246,092	February 1	325,440
July 1	272,301	January 1, 1902	291,992
June 1	336,107		

Alexander B. Scully, president of the Scully Steel & Iron Company, Chicago, has undergone an operation as a result of a previous operation for appendicitis. Mr. Scully's condition is favorable and he is progressing rapidly toward health.

The Iron and Metal Trades

October was a record breaking month, so far as the production of Pig Iron is concerned. The output of Coke and Anthracite Iron for the 31 days was 2,196,808 gross tons, against 2,165,632 tons in March of this year, and 1,970,962 tons in September, these totals being exclusive of Charcoal Pig Iron. The greater part of the increase in the output of October over September was contributed by the Steel companies, who reached the tremendous total of 1,452,200 tons, as contrasted with 1,264,380 tons in September.

The high output is reflected in the estimates of capacity of the furnaces in blast on the first of this month, when they were running at the rate of over 500,000 tons per week, the first time that that mark has ever been passed in the history of the American Iron industry. And yet, with our plants running at the rate of over 26,000,000 tons per year, there is a scarcity of metal all over the country, and foreign Iron is reaching our shores in many cargoes every week.

A considerable number of cargoes of foreign Pig Iron have been purchased abroad for American account, and the market is taking the metal freely. A disposition is developing to buy foreign Iron for forward delivery, and Iron cannot now be obtained by liners unless it be for delivery next year. The marked difference in this situation now and during the former import movement is that the spread between foreign and domestic Iron is much smaller. It was as much as $3 and $4 per ton when last considerable quantities were imported. Taking into account the cost of handling and delivering the foreign Pig Iron from the vessel's side to the regular routes of transportation there is now little difference in the cost of foreign and domestic Pig Iron.

Thus far there are no indications that the rise in the price of Pig Iron has in any way curtailed consumption. One of the largest consuming interests in the Foundry trade, the Cast Iron Pipe branch, is having a rush of new business, and inquiries for the coming season are coming up. Machinery manufacturers are exceedingly busy, and along the whole line of rolling mill products there is a congestion of work.

In the Chicago District new orders aggregating 100,000 tons for Plates, Shapes and Steel Bars have been placed in the past week. The Rail mills have booked additional tonnage. The car makers have added some large commitments, and some good bridge building orders have been taken. There are specifications out, too, for some important buildings in St. Louis and elsewhere. In the lighter lines, can makers are in the market for considerable quantities of Tin Plate, and the Merchant Pipe trade is booming.

During the week Wire products were advanced $1 per ton, while Hoops were put up from 1.90c. at mill to 2c. at mill. In the Eastern Plate trade premiums up to $2 per ton are becoming more general.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	Nov. 14, 1906.	Nov. 7, 1906.	Oct. 17, 1906.	Nov. 15, 1905.
PIG IRON, Per Gross Ton:				
Foundry No. 2, Standard, Philadelphia	**$23.50**	$22.75	$21.00	$18.00
Foundry No. 2, Southern, Cincinnati	**25.00**	23.00	20.00	16.75
Foundry No. 2, Local, Chicago	**24.50**	24.50	21.50	19.00
Bessemer, Pittsburgh	**22.85**	22.85	20.35	17.85
Gray Forge, Pittsburgh	**22.85**	22.85	19.35	16.60
Lake Superior Charcoal, Chicago	**23.50**	23.50	21.00	19.50
BILLETS, &c., Per Gross Ton:				
Bessemer Billets, Pittsburgh	**28.50**	28.50	28.00	26.00
Forging Billets, Pittsburgh	**36.00**	36.00	34.00	30.00
Open Hearth Billets, Phila	33.00	34.00	33.00	29.50
Wire Rods, Pittsburgh	**35.00**	35.00	34.50	32.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00
OLD MATERIAL, Per Gross Ton:				
O. Steel Rails, Chicago	**20.50**	20.00	18.00	16.50
O. Steel Rails, Philadelphia	**19.50**	18.75	18.50	18.25
O. Iron Rails, Chicago	**28.00**	28.00	26.00	23.00
O. Iron Rails, Philadelphia	**26.00**	25.50	25.50	24.00
O. Car Wheels, Chicago	**23.00**	21.50	19.25	17.50
O. Car Wheels, Philadelphia	**21.50**	21.50	20.75	17.00
Heavy Steel Scrap, Pittsburgh	**17.50**	16.75	16.75	18.00
Heavy Steel Scrap, Chicago	**17.50**	17.50	16.50	15.25
FINISHED IRON AND STEEL, Per Pound:	Cents.	Cents.	Cents.	Cents.
Refined Iron Bars, Philadelphia	1.83½	1.83½	1.83½	1.83½
Common Iron Bars, Chicago	1.71½	1.71½	1.71½	1.85
Common Iron Bars, Pittsburgh	**1.80**	1.80	1.60	1.84¾
Steel Bars, Tidewater, New York	1.64½	1.64½	1.64½	1.64½
Steel Bars, Pittsburgh	1.50	1.50	1.50	1.50
Tank Plates, Tidewater, New York	1.74½	1.74½	1.74½	1.74½
Tank Plates, Pittsburgh	1.60	1.60	1.60	1.60
Beams, Tidewater, New York	1.84½	1.84½	1.84½	1.84½
Beams, Pittsburgh	1.70	1.70	1.70	1.70
Angles, Tidewater, New York	1.84½	1.84½	1.84½	1.84½
Angles, Pittsburgh	1.70	1.70	1.70	1.70
Skelp, Grooved Steel, Pittsburgh	1.57½	1.57½	1.57½	1.55
Skelp, Sheared Steel, Pittsburgh	1.60	1.60	1.60	1.65
SHEETS, NAILS AND WIRE, Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, No. 27, Pittsburgh	**2.50**	2.50	2.40	2.15
Wire Nails, Pittsburgh	**1.90**	1.85	1.85	1.80
Cut Nails, Pittsburgh	**1.95**	1.90	1.90	1.65
Barb Wire, Galv., Pittsburgh	**2.35**	2.30	2.30	2.25
METALS, Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake Copper, New York	**22.50**	22.50	22.00	16.62½
Spelter, St. Louis	**6.35**	6.20	6.12½	6.00
Lead, New York	**6.00**	5.90	5.95	5.50
Lead, St. Louis	5.90	5.90	5.90	5.25
Tin, New York	42.65	42.50	43.40	33.25
Antimony, Hallett, New York	**25.00**	25.00	24.75	12.50
Nickel, New York	45.00	45.00	45.00	40.00
Tin Plate, Domestic, Bessemer, 100 lb., New York	**$4.09**	$4.09	$3.94	$3.49

Chicago.

FISHER BUILDING, November 14, 1906.—(*By Telegraph.*)

Specifications since the first of the month are again in excess of producing capacity and the tonnage accumulation on the mill order books of the Illinois Steel Company is on the increase. New business in Plates, Shapes and Steel Bars has been unusually heavy for this season and the contracts placed during the week aggregate 100,000 tons. An improvement in specifications for Structural Material is also reported, and for the present at least the mills in this district have their rolling programme well filled. The advance on Wire products of $1 a ton, which became effective November 10, reflects the Steel shortage and the difficulties surrounding operations are daily growing more severe. The threatened Hoop advance became a reality on November 7, quotations having been marked up $2 a ton. Bands, on the other hand, remain unchanged in price. Iron Bars, despite the high prices that are ruling in Pittsburgh and the East, remain unchanged here, although the advancing Old Material market is the forerunner of higher values. The Pig Iron market remains quiet and practically stationary as to price. Nearly all the large Southern producers have withdrawn from the market for the first quarter and are only offering Iron for second and third quarter shipment. Standard Rail tonnage remains comparatively light, although the Northern Pacific has placed an additional order for 15,000 tons. Gas companies throughout this territory are now figuring on their 1907 requirements, one order for 4000 tons having already been placed and another for about the same tonnage will be closed this week. The Great Northern is likewise asking bids on 4000 to 5000 tons for culverts and water line ex-

tensions. The switchmen's wage controversy has been adjusted and the indications are that little is to be feared from railroad labor troubles during the winter months.

Pig Iron.—Transactions have been limited almost entirely to small lots for immediate requirements at practically unchanged prices. On Southern grades several of the largest producers have withdrawn from the market for the first quarter, and are quoting on the basis of $18.50 to $19.50 for No. 2 for second and third quarter shipments. Car lots of Foundry Iron in transit are being sold at $25.90 to $26.90, Chicago, while local producers are asking practically the same prices on the small tonnage they have to offer. Deliveries, especially from the South, are being greatly delayed owing to the car shortage, and stocks in foundry yards in this district are running low. The demand for Malleable Bessemer for prompt shipment is heavy, although but little is to be had, and founders are using an increased percentage of Scrap. We quote as follows, f.o.b. Chicago:

Lake Superior Charcoal	$23.50 to $24.50
Northern Coke Foundry, No. 1	24.00 to 25.50
Northern Coke Foundry, No. 2	24.50 to 25.00
Northern Coke Foundry, No. 3	24.00 to 24.50
Northern Scotch, No. 1	25.00 to 25.50
Ohio Strong Softeners, No. 1	24.80 to 25.30
Ohio Strong Softeners, No. 2	24.30 to 24.80
Southern Coke, No. 1	25.40 to 25.90
Southern Coke, No. 2	24.90 to 25.40
Southern Coke, No. 3	24.40 to 24.90
Southern Coke, No. 4	23.90 to 24.40
Southern Coke, No. 1 Soft	25.40 to 25.90
Southern Coke, No. 2 Soft	24.90 to 25.40
Southern Gray Forge	22.40 to 22.90
Southern Mottled	21.90 to 22.40
Malleable Bessemer	24.00 to 24.30
Standard Bessemer	24.30 to 24.80
Jackson Co. and Kentucky Silvery, 6 %	26.30 to 26.80
Jackson Co. and Kentucky Silvery, 8 %	28.30 to 28.80
Jackson Co. and Kentucky Silvery, 10 %	30.30 to 30.80

Metals.—Pig Tin values have declined slightly, due to irregular trading, and Lead is also weaker. Copper, on the other hand, maintains its strength with active buying for spot needs. We quote: Casting Copper, 23¾c. to 24¼c.; Lake, 24c. to 24½c., in car lots for prompt shipment; small lots, ¼c. to ⅜c. higher; Pig Tin, car lots, 45¼c.; small lots, 45¾c. to 46c.; Lead, Desilverized, 6.05c. to 6.15c., for 50-ton lots; Corroding, 6.75c. to 6.85c. for 50-ton lots; on car lots, 2¼c. per 100 lb. higher; Cookson's Antimony, 28½c., and other grades, 26½c. to 27½c.; Sheet Zinc is 7.90c. list, f.o.b. Lasalle, in car lots of 600-lb. casks. On Old Metals we quote: Copper Wire, 18¾c.; Heavy Copper, 18¼c.; Copper Bottoms, 17¼c.; Copper Clips, 18c.; Red Brass, 18c.; Red Brass Borings, 16c.; Yellow Brass, 13¼c.; Yellow Brass Borings, 12¼c.; Light Brass, 9¼c.; Lead Pipe, 5.40c.; Tea Lead, 5c.; Zinc, 5c.; Pewter, No. 1, 26c.; Tin Foil, 32c.; Block Tin Pipe, 27½c.

(*By Mail.*)

Billets and Rods.—Transactions are largely limited to small lots of forging billets for early deliveries, and prices as high as $46 a ton are being paid according to analysis. Rods continue exceedingly scarce, and for immediate delivery Pittsburgh mills are quoting $35 a ton on either Bessemer or Open Hearth, equivalent to $38, Chicago.

Rails and Track Supplies.—The Northern Pacific Railroad has placed an order of 15,000 tons of Standard Section Rails for 1907 delivery, while 1200 tons were received from an Illinois road and transferred to the Carnegie Steel Company. On Spikes the Illinois Steel Company is practically out of the market through the greater part of next year. Light Rails continue in heavy demand, notwithstanding recent price advances, and sales thus far this month aggregate nearly 5000 tons. Quotations are as follows: Angle Bars, accompanying Rail orders, 1906 delivery, 1.50c.; carload lots, 1.75c.; Spikes, 2.25c. to 2.50c., according to delivery; Track Bolts, 2.65c. to 2.75c., base, Square Nuts, and 2.80c. to 2.90c., base, Hexagon Nuts. The store prices on Track Supplies range from 0.15c. to 0.20c. above mill prices. Light Rails, 30 to 45 lb. sections, $32; 25-lb., $33; 20-lb., $34; 16-lb., $35; 12-lb., $36, f.o.b. mill. Standard Sections, $28, f.o.b. mill, full freight to destination.

Structural Material.—Specifications the past week have been coming in somewhat more freely than heretofore, and a large tonnage was booked by the Illinois Steel Company from one of the Western distributers. At St. Louis specifications are out for the Steel for two large buildings amounting to nearly 10,000 tons. Estimates have been made and specifications will be out in about 30 days for the Steel for the first of a series of shops to be erected by the Grand Trunk Railroad at Battle Creek, Mich., aggregating 2000 tons. Shapes from store are in fairly good demand at 2.05c. to 2.10c. Mill quotations are unchanged, as follows: Beams and Channels, 3 to 15 in., inclusive, 1.86½c.; Angles, 3 to 6 in., ¼-in. and heavier, 1.86½c.; larger than 6 in. on one or both legs, 1.96½c.; Beams, larger than 15 in., 1.96½c.; Zees, 3 in. and over, 1.86½c.; Tees, 3 in. and over, 1.91½c., in addition to the usual extras for cutting to extra lengths, punching, coping, bending and other shop work.

Plates.—The Plate situation is exceedingly strong, the Illinois Steel Company having a large tonnage booked in addition to specifications on mill order books, covering two months' output. Contracts for a large tonnage have also been placed during the week by several of the large distributers. Eastern mills are well situated as regards deliveries, being in position to make shipment within 10 days or two weeks. Prices are as follows: Tank Plates, ¼-in. and heavier, wider than 6¼ and up to 100 in. wide, inclusive, car lots, Chicago, 1.76¼c.; 3-16 in., 1.86½c.; Nos. 7 and 8 gauge, 1.91½c.; No. 9, 2.01½c.; Flange quality, in widths up to 100 in., 1.86½c.; base, for ¼-in. and heavier, with the same advance for lighter weights; Sketch Plates, Tank quality, 1.86½c.; Flange quality, 1.96½c. Store prices on Plates are as follows: Tank Plate, ¼-in. and heavier, up to 72 in. wide, 2c. to 2.10c.; from 72 to 96 in. wide, 2.10c. to 2.20c.; 3-16 in., up to 60 in. wide, 2.10c. to 2.20c.; 72 in. wide, 2.35c. to 2.45c.; No. 8 up to 60 in. wide, 2.15c. to 2.25c.; Flange and Head quality, 0.25c. extra.

Sheets.—Deliveries of both Black and Galvanized Sheets continue to be delayed from two to three months, and assorted gauges from stock continue to command high prices. Manufacture in the lighter lines is being greatly hampered owing to the deferred deliveries of the Sheet mills, and consumers generally are without stocks. Quotations as follows: Blue Annealed, No. 10, 1.96½c.; No. 12, 2.01½c.; No. 14, 2.06½c.; No. 16, 2.16½c.; Box Annealed, Nos. 17 to 21, 2.51½c.; Nos. 22 to 24, 8.56½c.; Nos. 25 and 26, 2.61½c.; No. 27, 2.66½c.; No. 28, 2.76½c.; No. 29, 2.86½c.; No. 30, 2.96½c.; Galvanized Sheets, Nos. 10 to 14, 2.71½c.; Nos. 15 and 16, 2.91½c.; Nos. 17 to 21, 3.06½c.; Nos. 22 to 24, 3.21½c.; Nos. 25 to 26, 3.41½c.; No. 27, 3.61½c.; No. 28, 3.81½c.; No. 30, 4.31½c. Sheets from store, Blue Annealed, No. 12, 2.25c.; No. 14, 2.30c.; No. 16, 2.40c.; Box Annealed, Nos. 18 to 21, 2.70c.; Nos. 22 to 24, 2.75c.; No. 26, 2.80c.; No. 27, 2.85c.; No. 28, 2.95c.; No. 30, 3.35c.; Galvanized from store, Nos. 10 to 20, 3.20c. to 3.25c.; Nos. 22 to 24, 3.45c. to 3.50c.; No. 26, 3.55c. to 3.60c.; No. 27, 3.65c. to 3.85c.; No. 28, 4.00c.; No. 30, 4.55c. to 4.60c.

Bars.—Hoops were advanced $2 a ton on Wednesday, November 7, although Bands remain practically unchanged in price. The Bar Iron market, while considerably stronger locally, is still on a basis of 1.55c. to 1.60c., Pittsburgh. For Eastern shipment the Iron mills in the vicinity of Pittsburgh are having no difficulty in securing 1.70c. and contracts for 4000 tons were placed with the Illinois Steel Company on this basis. Steel Bars continue to be sold freely at 1.66½c., Chicago, although several of the Eastern mills are asking and securing an advance of $2 a ton. We quote as follows: Iron Bars, 1.71½c.; Steel Bars, 1.66½c. to 1.76½c., both half extras; Hoops, 2.16½c., extras as per Hoop card; Bands, 1.66½c., as per Steel card; Soft Steel Angles and Shapes, 1.66½c., half extras. Store prices are as follows: Bar Iron, 2.10c. to 2.25c.; Steel Bars, 1.85c. to 2c.; Steel Bands, 1.85c. to 1.90c., half extras; Soft Steel Hoops, 2.35c. to 2.45c., full extras.

Merchant Pipe.—Large Western jobbers of Merchant Pipe are buying freely in spite of the season and the mills and immediate shipments are invariably demanded, indicating that stocks are generally low. Fairly prompt deliveries are being made, although on certain sizes from two to four weeks are required. We revise discounts, car lots, Chicago, as follows: Black Steel Pipe, 77.35, on the base sizes, ¾ to 6 in., and Galvanized, 67.35. From store in small lots Chicago jobbers quote 74½ to 75 per cent. on Black Steel Pipe, ¾ to 6 in.

Boiler Tubes.—The mills report continued heavy buying on the part of jobbers and consumers, and the opinion prevails in the trade that prices will be shortly advanced. Mill quotations are unchanged, as follows, on base sizes 2¾ to 5 in., in carload lots: Steel Tubes, 68.35; Iron, 55.35; Seamless, 50.35; 2½-in. and smaller and lengths over 18 ft., and 2½-in. and lengths over 22 ft., 10 per cent. extra. Store prices are unchanged, as follows:

	Steel.	Iron.	Seamless.
1 to 1½ in.	40	35	42½
1¾ to 2¼ in.	50	35	35
2½ in.	52½	35	30
2¾ to 5 in.	60	47½	42½
6 in. and larger	50	35	..

Merchant Steel.—A heavy increase in specifications is reported by nearly all of the mills since the first of the month, indicating that consumption is increasing. Tonnage, however, is light, as most of the contracts on which most of the mills are now operating were made early in the summer. We quote: Planished or Smooth Finished Tire Steel, 1.86½c.; Iron Finish, up to 1½ x ½ in., 1.81½c.; Iron Finish, 1½ x ½ in. and larger, 1.66½c., base; Channels for solid rubber Tires, ¾ to 1 in., 2.16½c., and 1⅛-in. and larger, 2.06½c.; Smooth Finished Machinery Steel, 1.91½c.; Flat Sleigh Shoe, 1.71½c.; Concave and Convex Sleigh Shoe, 1.96½c.; Cutter Shoe, 2.35c.; Toe Calk Steel, 2.21½c.; Railway Spring, 1.86½c.; Crucible Tool Steel, 6½c. to 8c., and still higher prices are asked on special grades. Shafting, 50 per cent. off in car lots, and 45 per cent. in less than car lots, in base territory.

Cast Iron Pipe.—Gas companies are now beginning to cover their 1907 requirements, the American Gas Company having placed a contract for 4000 tons with J. K. Dimmick & Co., and the Laclede Gas Company of St. Louis is in the market for 5000 tons. The Great Northern Railroad has

also made inquiry for approximately 4000 tons of Pipe for culverts and water line extensions. Municipalities, however, are not interested in covering for their future requirements, and notwithstanding the strength of the general market, it is doubtful whether their specifications will be available until after the first of the year. Quotations are as follows: Water Pipe, 4-in., $36; 6, 8, 10 and 12 in., $34.50; over 12-in., $34, with $1 extra for Gas Pipe.

Coke.—As the by-product Coke producers in the West are practically out of the market, consumers of Foundry Coke that failed to previously cover their requirements are now seeking to place contracts for both Virginia and Connellsville Coke through the first half of next year. The market is firmly established on the basis of $4 at the ovens, equivalent to $6.65, Chicago, for either Connellsville or by-product, and $6.25 for Virginia.

Old Material.—Notwithstanding the heavy sales of all grades of Scrap made by the railroads last week, and aggregating nearly 10,000 tons, prices in several lines have again moved upward. Car Wheels, owing to the tremendous output of new cars, are being eagerly sought for by Car Wheel makers, and the outcome from the railroads is exceedingly light. Sales have been made during the week on the basis of $23, Chicago, and the market to-day is fully 50c. a ton above this price. The shortage of Heavy Melting Steel in the Pittsburgh district has brought dealers from that section into this market, and it is probable that large transactions will be closed before the end of the week. The activity in Cast Scrap continues unabated, although prices are practically unchanged. Railroad Malleable has also been sharply advanced. Quotations on gross tons, car lots, f.o.b. Chicago, are as follows:

Old Iron Rails	$28.00 to $29.00
Old Steel Rails, 4 ft. and over	21.50 to 22.00
Old Steel Rails, less than 4 ft.	20.50 to 21.00
Heavy Relaying Rails, subject to inspection, 50 lb. and under	29.00 to 31.00
Old Car Wheels	23.00 to 23.50
Heavy Melting Steel Scrap	17.50 to 18.00
Frogs, Switches and Guards	18.50 to 19.00
Mixed Steel	15.00 to 15.50

The following quotations are per net ton:

Iron Fish Plates	$23.00 to $23.50
Iron Car Axles	27.50 to 28.00
Steel Car Axles	23.50 to 24.00
No. 1 Railroad Wrought	18.00 to 18.50
No. 2 Railroad Wrought	17.00 to 17.50
Railway Springs	16.00 to 16.50
Locomotive Tires, smooth	16.00 to 16.50
No. 1 Dealers' Forge	13.50 to 14.00
Mixed Busheling	11.50 to 12.00
Iron Axle Turnings	11.00 to 11.50
Soft Steel Axle Turnings	11.00 to 11.50
Machine Shop Turnings	11.00 to 11.50
Cast Borings	9.00 to 9.50
Mixed Borings, &c	9.00 to 9.50
No. 1 Mill	10.50 to 11.00
No. 2 Mill	9.50 to 10.00
No. 1 Boilers, cut to Sheets and Rings	12.50 to 13.00
No. 1 Cast Scrap	17.50 to 18.00
Stove Plate and Light Cast Scrap	13.50 to 14.00
Railroad Malleable	18.00 to 18.50
Agricultural Malleable	17.00 to 17.50

Pittsburgh.

PARK BUILDING, November 14, 1906.—(*By Telegraph.*)

Pig Iron.—A movement is under way by leading producers of Bessemer Pig Iron to raise the limit two points on phosphorus, and this will probably be done in the near future. The reason given for this contemplated action is the shortage in supply of Bessemer Ores and the higher prices these Ores are bringing for next season's delivery. The market has been rather quiet the past week. A small tonnage of Bessemer, among which was one lot of 2000 tons, has been sold for delivery in third quarter of next year on the basis of $21, Valley furnace. We note sales of 3000 to 4000 tons of Bessemer for November and December delivery at $22, Valley furnace. A sale is also reported of about 5000 tons of Basic Iron for delivery from April to December of next year on the basis of $20.25 at Valley furnace. There is a moderate inquiry for Foundry Iron, but mostly in small lots for prompt delivery. We note sales of 300 to 400 tons of Northern No. 2 Foundry for November and December shipment at $24, Valley furnace. For delivery in first quarter and first half of next year Northern No. 2 Foundry is held at $22.50 and higher at Valley furnace. Northern Forge Iron for prompt delivery brings $22, Valley furnace, and for delivery in first quarter $21 at furnace has been paid.

Steel.—We note a continued shortage of both Bessemer and Open Hearth Steel, and prices are very firm. We quote Bessemer Billets at about $28.50 to $29, and Open Hearth $31.50 to $32, Pittsburgh. Sheet Bars in random lengths are held at $29.50 to $30, Pittsburgh.

(*By Mail.*)

An enormous tonnage of Ore sold at the new and higher prices for 1907 delivery, and advances of $2 a ton in Steel Hoops and $1 a ton in Wire products are the principal events of the week under review. There has not been much Pig Iron sold, the demand being mainly for small lots for prompt shipment, for which sellers can get practically any prices they ask if they can ship immediately. It is reported that small lots of Bessemer Iron for November and December shipment have been sold at $23, Valley furnace. Northern No. 2 Foundry for prompt delivery has brought $24, Valley furnace. There is a fair demand for Steel, Bessemer Billets being held at $29.50 to $30, and Open Hearth $31 to $32, Pittsburgh. New business in Finished Iron and Steel continues very heavy. The mills are now filled up for months. Scrap prices are higher and a fair amount of tonnage is changing hands.

Ferromanganese.—There is a good deal of inquiry. Ferro for prompt shipment is scarce and brings high prices. We quote 80 per cent. for prompt delivery at $82.50 to $85 and for forward delivery at $75 to $77.50, the price depending largely on how far ahead the customer is willing to contract.

Wire Rods.—Rods for prompt delivery continue scarce and bring high prices, it being practically impossible to get Open Hearth Rods at any price. We quote Bessemer Rods at $35 to $35.50, and Open Hearth Rods at $36.50 to $37, Pittsburgh.

Muck Bar.—There is a very active demand, Muck Bar for reasonably prompt shipment being hard to obtain. We quote best grades made from all Pig Iron at $35 to $35.50, and from part Scrap at about $32, Pittsburgh.

Skelp.—Specifications on contracts continue to come in freely and a fair amount of new tonnage is being placed. Prices are firm and we quote: Grooved Steel Skelp, 1.57½c. to 1.65c.; Sheared Steel Skelp, 1.60c. to 1.70c.; Grooved Iron Skelp, 1.65c. to 1.75c.; Sheared Iron Skelp, 1.80c. to 1.85c., Pittsburgh, these prices depending on widths and gauges.

Steel Rails.—Some business in Standard Sections was taken by the Carnegie Steel Company during the week, and we note an active demand for Light Rails. Prices on the latter are practically certain to be advanced $1 a ton by the Carnegie Company within a short time, this action having already been taken by the Illinois Steel Company. It is claimed that with the way tonnage is coming in for Standard Sections the leading Rail mills will soon be sold up for practically all of next year. We quote Light Rails as follows: 20 to 45 lb. Sections, $31; 16-lb. Sections, $32, and 12-lb. Sections, $33, at mill. Standard Sections are $28, at mill.

Structural Material.—Almost all the tonnage now being placed is for bridge work. Some of the railroads have already contracted for a good part of their requirements for 1907 and other roads are getting ready to do so. The Riter-Conley Mfg. Company has taken a good deal of tonnage in the past week. The Structural shops will have a very busy winter, as most of them are filled to May or June of next year, while the American Bridge Company is said to be filled to October, 1907. Prices are very firm and we quote: Beams and Channels, up to 15-in., 1.70c.; over 15-in., 1.80c.; Angles, 3 x 2 x ¼ in. thick up to 6 x 6 in., 1.70c.; 8 x 8 and 7 x 3½ in., 1.80c.; Zees, 3-in. and larger, 1.70c.; Tees, 3-in. and larger, 1.75c. Under the Steel Bar card Angles, Channels and Tees under 3-in. are 1.60c., base, for Bessemer and Open Hearth, subject to half extras on the Standard Steel Bar card.

Plates.—The Carnegie Steel Company has started to build a new 72-in. Plate mill at the Homestead Steel Works, which will greatly increase the already enormous tonnage of this plant. The output of Plates in October by the Carnegie Company, Jones & Laughlin and other leading mills was much the heaviest in any one month in their history. The leading mills are sold up for practically four to six months on both Universal and Sheared Plates, but some of the smaller mills can make deliveries in about four to six weeks. An enormous tonnage is coming in from the Steel car builders. Additional large contracts for cars have just been placed by the Chicago, Rock Island & Pacific and the Pennsylvania railroads. Prices continue firm, but are unchanged as follows. Tank Plates, ¼ in. thick, 6¼ in. up to 100 in. in width, 1.60c., base, at mills, Pittsburgh. Extras over this price are as follows:

	Extra per 100 lb.
Gauges lighter than ¼-in. to and including 3-16-in. Plates on thin edge	$0.10
Gauges Nos. 7 and 8	.15
Gauge No. 9	.25
Plates over 100 to 110 in.	.05
Plates over 110 to 115 in.	.10
Plates over 115 to 120 in.	.15
Plates over 120 to 125 in.	.25
Plates over 125 to 130 in.	.50
Plates over 130 in.	1.00
All sketches (excepting straight taper Plates varying not more than 4 in. in width at ends, narrowest end being not less than 30 in.)	.10
Complete Circles	.20
Boiler and Flange Steel Plates	.10
"A. B. M. A." and ordinary Firebox Steel Plates	.20
Still Bottom Steel	.30
Marine Steel	.40

Shell Grade of Steel is abandoned.

TERM.—Net cash 30 days. For anticipated payments a maximum discount may be allowed at the rate of 6 per cent. per annum and for a longer time than 30 days interest shall be

charged at the same rate per annum. Invoices paid within 10 days from date thereof, discount of ½ of 1 per cent. is allowable. Pacific Coast base, 1.60c., f.o.b. Pittsburgh, with all rail tariff rate of freight to destination added, no reduction for rectangular shapes 14 in. wide down to 6 in. of Tank, Ship or Bridge quality.

Sheets.—The demand is fairly heavy, but many of the leading consumers covered their requirements into first quarter and through first half of next year before the advance in prices was made and which went into effect October 25. The leading Sheet mills are pretty well sold up for the next three or four months, and specifications on contracts are coming in freely. Shipments by the leading mills in October broke all previous records. Prices are firm, but unchanged, as follows: Blue Annealed Sheets, No. 10 gauge and heavier, 1.80c.; Nos. 11 and 12, 1.85c.; Nos. 13 and 14, 1.90c.; Nos. 15 and 16, 2c.; Box Annealed, Nos. 17 to 21, 2.35c.; Nos. 22 to 24, 2.40c.; Nos. 25 and 26, 2.45c.; No. 27, 2.50c.; No. 28, 2.60c.; No. 29, 2.75c.; No. 30, 2.85c. We quote Galvanized Sheets as follows: Nos. 10 and 11, 2.55c.; Nos. 12 and 14, 2.65c.; Nos. 15 and 16, 2.75c.; Nos. 17 to 21, 2.90c.; Nos. 22 and 24, 3.05c.; Nos. 25 and 26, 3.25c.; No. 27, 3.45c.; No. 28, 3.65c.; No. 29, 3.90c., and No. 30, 4.15c. We quote No. 28 Gauge Painted Roofing Sheets at $1.85 per square, and Galvanized Roofing Sheets, No. 28 Gauge, $3.15 per square for 2-in. corrugations. These prices are for carload lots, jobbers charging the usual advances for small lots from store.

Iron and Steel Bars.—New business in both Iron and Steel Bars continues heavy, and with specifications on contracts being received in large volume the mills are simply flooded with work and are from eight weeks to four or five months behind in shipments. Premiums continue to be paid on both Iron and Steel Bars for reasonably prompt deliveries. The Carnegie and Jones & Laughlin companies continue to quote 1.50c. on Steel Bars for indefinite delivery, but all the other mills are quoting 1.60c. for shipment within four to six weeks, and are booking some business at this price. We quote Iron Bars at 1.80c. to 1.85c., Pittsburgh, depending on deliveries, and Steel Bars at 1.50c. to 1.60c. base, half extras, f.o.b. Pittsburgh. On both Iron and Steel Bars the lower prices quoted are for indefinite delivery.

Hoops and Bands.—Effective November 8, the four leading mills making Steel Hoops, these being the Carnegie Steel Company, Pittsburgh Steel Company, Sharon Steel Hoop Company and Atlanta Steel Hoop Company, announced an advance of $2 a ton, or from 1.90c. to 2c. per pound. It was originally intended to have this advance go into effect November 1, but for some reason it was postponed for one week. The demand for both Hoops and Bands has been quite active for some time, while specifications on contracts have been heavy. The mills are now filled with tonnage for some months, a large part of which was placed before the advance. We quote: Steel Hoops, 1.90c., and Bands for all purposes at 1.50c., base, half extras, as per Standard Steel card. These prices are for carload lots, f.o.b. Pittsburgh, plus full tariff rail rate to point of delivery, an advance of $2 a ton being charged for less than carloads.

Tin Plate.—Shipments by the mills on contracts continue heavy, and a good deal of new business is being placed. The leading mills are entering orders for delivery up to July 1, 1907, at present prices, and several large inquiries for Bright Plates for Tin Can manufacturers are in the market. Indications are that the Tin Plate mills will have all the tonnage they can take care of during the winter months and into April and May of next year. The output is still being restricted by the shortage in supply of Tin Bars. We quote $3.90 per base box, f.o.b. Pittsburgh, for 14 x 20 100-lb. Cokes, terms 30 days, less 2 per cent. off for cash in 10 days, on which price a rebate of 5c. a box is allowed for carload and larger lots.

Railroad Spikes.—Extensions and new track laying by the railroads have brought about the heaviest demand for Spikes ever known in the history of the trade, and all the Spike works are filled up for the next three or four months, while one or two leading makers have orders enough on their books to run them to May or June of next year. We quote Spikes on contracts for indefinite delivery at $2.40 to $2.50 per 100 lb., while for prompt delivery up to $3 has been paid.

Spelter.—We note a heavy demand, and the market is very firm. Prime grades of Western are held at 6.20c., St. Louis, equal to 6.32½c., Pittsburgh.

Pipes and Tubes.—The West Virginia & Maryland Gas Company is in the market for 12 miles of 6-in. Line Pipe for delivery to West Virginia and Maryland points. The order for 275 miles of 10-in. Line Pipe for the Burmah Oil Company, Burmah, India, has not yet been placed, but will probably be closed up this week. A great many gas and oil line projects are being laid out for next year, and if one-half of the tonnage that is under way is placed it means that the Pipe mills will have all the business and more in large Pipe that they can take care of during all of next year. New business in Merchant sizes of Pipe continues heavy, and the leading mills are filled up for three months or longer. The market is firm, and there is some talk of a further advance in Pipe, but nothing official regarding this has been given out. The extreme discount on Merchant sizes of Steel Pipe is now 70 and 5 per cent. off to the large trade. The official discounts, which are shaded one point or more to the large trade, are as follows:

Merchant Pipe.

	Jobbers, carloads.			
	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
	%	%	%	%
⅛ and ¼ in.	70	54	65.5	49.5
⅜ in.	72	58	65.5	57.5
½ in.	74	62	73.5	63.5
¾ to 6 in.	78	68	73.5	63.5
7 to 12 in.	73	58	69	54
Extra strong, plain ends:				
⅛ to ⅜ in.	63	51	58.5	46.5
½ to 4 in.	70	58	65.5	53.5
4½ to 8 in.	66	54	61.5	48.5
Double extra strong, plain ends:				
½ to 8 in.	59	48	53.5	42.5

Boiler Tubes.—New business in Boiler Tubes is quite heavy and specifications on contracts are coming in freely. Prices are firm and there are intimations that an advance may be made before long. Official discounts are as follows:

Boiler Tubes.

	Iron.	Steel.
1 to 1½ in.	45	50
1¾ to 2¼ in.	45	62
2½ in.	50	64
2¾ to 5 in.	57	70
6 to 13 in.	45	62

Iron and Steel Scrap.—Prices are higher. However, only a limited tonnage is being sold for the reason that the large consumers are pretty well covered and are inclined to take chances on the market when they have to come in again to buy, while, on the other hand, dealers who have stocks of Scrap firmly believe that top prices have not been reached and are inclined to hold their Scrap unless they can sell at their prices. It frequently happens that prices made on Scrap by sellers that are not immediately accepted are advanced and higher figures quoted when the buyer comes back again to close up the business. We have advanced our prices on nearly all lines of Scrap, now quoting as follows per gross ton, f.o.b. Pittsburgh: Heavy Melting Scrap, $17.50 to $17.75; No. 1 Wrought Scrap, $21; No. 2 Wrought Scrap, $18.25; Old Steel Rails, short pieces, 6 ft. and under, for Open Hearth purposes, $17.50 to $17.75; Old Steel Rails, rerollers, $20.50; Bundled Sheet Scrap, $17.25 to $17.50; Cast Iron Borings, $12 to $12.25; Wrought Turnings, $14.25 to $14.50. Old Car Wheels are very scarce and readily command $22.50 to $23. A good deal of tonnage in low phosphorus metal stock has recently been sold and it is firm at $23. Steel Axles are firm at $22.50 and Iron Axles at $30 to $30.50. No. 1 Cast Scrap is $19 to $19.50 and a good deal of tonnage has been sold in the past two weeks. Stove Plate is selling at $15.50; Grate Bars, $14.50, and Railroad Malleable at about $18.

Coke.—Some inquiries are in the market for Furnace Coke for delivery over first half of next year, and contracts have been made for strictly Connellsville Furnace Coke on the basis of $3 a ton at oven, while it is reported that as high as $3.10 has been paid in several cases. Strictly Connellsville Foundry Coke for this year delivery has sold at $4.25 at oven, while on contracts for first half of next year $3.75 to $4 a ton has been paid. Indications are that the demand for Furnace and Foundry Coke for the balance of this year and through the first half of next year will take the Coke as fast as the ovens turn it out, if it can be shipped. Some new plants are going up in the region, the Fayette Coke Company having started to build 60 ovens at its Shamrock plant, while the Clair Coal & Coke Company has added 50 ovens, now hving a total of 100. The Shenango Furnace Company is building 200 ovens and will eventually increase the number. The output in the Upper and Lower Connellsville regions last week was 395,430 tons, a slight increase over the previous week. The labor supply in the Coke regions is better than for some time, while cars are more plentiful and shipments are correspondingly heavy. It is a notable fact that the output of Coke in the Upper and Lower Connellsville regions at present is at the rate of nearly 20,000,000 tons a year, being by far the largest product ever turned out of the region.

The Hausman & Wimmer Company, which formerly conducted a Scrap Iron business at Greenough street, Pittsburgh, has removed all Scrap Iron from that place to its yards at Carnegie, Pa., but is retaining an office and a four-story warehouse at 111-115 Second avenue, Pittsburgh, Pa., where it is conducting a large business in Metals, Rags, &c.

Birmingham.

BIRMINGHAM, ALA., November 11, 1906.

Pig Iron.—The excited condition which has prevailed for the past few weeks has subsided somewhat and the market is now on a slightly more settled basis. Buying has latterly not been so extensive, but the market has lost none of its firmness and the tendency is still upward. Sales of spot Iron as high as $24 are reported, and the only large interest offering any Iron for first quarter's delivery is

quoting a limited tonnage at $21. For second quarter prices vary considerably, ranging all the way from $18 to $20, depending largely on conditions of sellers' order books. Two weeks ago one of the largest producers in the district had only sold about 35 per cent. of its estimated production for the second quarter, but now claims to have orders for more than one-half. Production is increasing to a certain extent and the furnaces are turning out better grades of Iron. This, however, is not much consolation for the melter, who, though he has the Iron bought, cannot secure deliveries. The car situation has grown so bad that it has been taken up with the roads by the State Railroad Commission, but officials hold out no encouragement for immediate relief. The cotton crop is receiving first consideration, and as by the time this is moved the blockade north of the Ohio River will be on it is very probable that prevailing conditions will continue throughout the winter. Stocks are rapidly accumulating on furnace yards.

The furnace of the Central Iron & Coal Company at Holt, which has been undergoing repairs and relining for the past 60 days, will be blown in the latter part of the week.

Cast Iron Pipe.—No large lettings in which the manufacturers here are interested are advertised for the near future, but Southern foundries are figuring on several large orders to be let privately. The high prices which are necessarily prevailing on account of the increased cost of raw material are limiting new business to a certain extent. This, however, will have little effect on the foundries, as with the orders already placed, which in some instances are sufficient to keep them running until next spring, and the numerous small orders which are always placed regardless of price, it looks now as if next year would be the largest in the history of the Pipe business. Prices are very irregular, but quotations on Water Pipe are approximately as follows, f.o.b. cars, here: 4 to 6 in., $33; 8 to 12 in., $32; over 12-in., $29, with $1 per ton extra for Gas Pipe.

Old Material.—There is a steady demand for Scrap of every kind and all offerings are snapped up without delay. Wrought, which has not been so active as other grades for the past few weeks, is now in considerable demand. Many of the foundries which are unable to secure Pig Iron are asking for a larger quantity of Cast Scrap than heretofore and dealers are taxed to supply the quantity required. Prices have again advanced and quotations are about as follows per gross ton, f.o.b. dealers' yards:

Old Iron Rails	$21.50 to $22.00
Old Iron Axles	19.00 to 19.50
Old Steel Axles	16.50 to 17.50
Old Car Wheels	17.50 to 18.50
No. 1 Railroad Wrought	18.00 to 18.50
No. 2 Railroad Wrought	15.00 to 15.50
No. 1 Country Wrought	15.00 to 15.50
No. 2 Country Wrought	12.00 to 12.50
Wrought Pipe and Flues	12.00 to 12.50
Railroad Malleable	13.00 to 13.50
No. 1 Steel	14.00 to 14.50
No. 1 Machinery Cast	15.00 to 15.50
Stove Plate and Light Cast	10.50 to 11.00
Cast Borings	7.50 to 8.00

The sale of the Lookout Mountain Iron Company on the 5th inst. has been confirmed by the court. Under the terms of sale the purchasers have the right to apply any bonds in their possession against the purchase price, but an effort is now being made to have this set aside and to have the bonds nullified as liabilities of the company. This may result in tieing the property up in litigation for some time to come. No intimation as to whether or not the furnace will be put in operation has been given out here.

Cincinnati.

FIFTH AND MAIN STS., November 14, 1906.—(*By Telegraph.*)

Pig Iron.—The market situation, so far as spot demand is concerned, is showing some signs of becoming easier, sales of this character being more in the nature of special emergency and commanding the highest prices. It is generally conceded that the larger percentage of consumers are fully covered for the remainder of the current year and would have no difficulty in meeting the demands of their trade, were it not for the fact that they are unable in most instances to secure what Iron is due them on contracts. Investigations in the South as regards the car situation show that conditions have not been exaggerated and that the furnaces, without exception, have found it impossible to obtain more than a small percentage of the equipment demanded. Furnace production is somewhat curtailed by the scarcity of Ore and Coke, which, in conjunction with the ever present labor troubles, is causing strictures of the gravest kind. It is quite a difficult proposition to ascertain the exact figure at which spot Iron is quotable, as prices are erratic and vary with the sale of each lot. It looks, however, as though $22 to $23, Birmingham, for No. 2 is fairly quotable for current delivery, with first quarter from $20 to $21 and second quarter $17.50 to $18. So far as the Northern situation is concerned, there is said to be practically no Iron available for early delivery, with $25 at furnace quotable, while $22 for first quarter and $21 for second possibly represent the quotations into next year. High Silicon Irons are reported decidedly scarce, any tonnage available commanding top prices. Several large inquiries for Bessemer and Basic are reported, with Gray Forge in fair demand. Freight rates from Hanging Rock District to Cincinnati are $1.15, and from Birmingham, $3. We quote, f.o.b. Cincinnati, as follows:

Southern Coke, No. 1	$26.00 to $27.00
Southern Coke, No. 2	25.00 to 26.00
Southern Coke, No. 3	24.00 to 25.00
Southern Coke, No. 4	23.00 to 24.00
Southern Coke, No. 1 Soft	26.00 to 27.00
Southern Coke, No. 2 Soft	25.00 to 26.00
Southern Coke, Gray Forged	22.00 to 23.00
Southern Coke, Mottled	21.00 to 22.00
Ohio Silvery, 8 per cent	29.15
Lake Superior Coke, No. 1	25.65 to 26.65
Lake Superior Coke, No. 2	25.15 to 26.15
Lake Superior Coke, No. 3	24.65 to 25.65
Car Wheel Irons.	
Standard Southern Car Wheel	$28.00 to $28.50
Lake Superior Car Wheel	27.00 to 27.50

Coke.—The market is firm, the demand being strong with prices a shade higher. Shipments show a slight decrease due to shortage of cars. Spot delivery prices are from $4 to $4.25, at oven, for the best brands of Connellsville and Virginia.

Finished Iron and Steel.—Light Rails are reported in heavy demand, with prices very stiff. Plate mills are crowded with work far into next year. Bar Iron has been advanced to nominally 1.75c., Pittsburgh, or 1.88c. here. We quote, f.o.b. Cincinnati, as follows: Iron Bars, in carload lots, 1.88c., with half extras; the same, in smaller lots, 2c., with full extras; Steel Bars, in carload lots, 1.63c., with half extras; the same, in smaller lots, 1.85c., with full extras; Base Angles, 1.83c., in carload lots; Beams and Channels, in carload lots, 1.83c.; Plates, ¼-in. and heavier, 1.73c., in carload lots; in smaller lots, 1.90c.; Sheets, 16 gauge, in carload lots, 2.15c.; in smaller lots, 2.70c.; 14 gauge, in carload lots, 2.05c.; in small lots, 2.60c.; Steel Tire, 1 x ¼ in. or heavier, 1.83c., in carload lots.

Old Material.—In sympathy with the Pig Iron market, the demand has increased and prices are a shade higher. We quote dealers' prices, f.o.b. Cincinnati, as follows:

No. 1 Railroad Wrought, net ton	$18.50 to $19.50
Cast Borings, net ton	9.50 to 10.50
Steel Turnings, net ton	11.50 to 12.50
No. 1 Cast Scrap, net ton	16.50 to 17.50
Old Iron Axles, net ton	26.50 to 27.50
Old Iron Rails, gross ton	25.00
Old Steel Rails, long, gross ton	17.50 to 18.50
Relaying Rails, 56 lb. and up, gross ton	28.50 to 29.50
Old Car Wheels, gross ton	18.50 to 19.50
Low Phosphorus Scrap, gross ton	19.50 to 20.50

CORRECTION.—In the issue of November 1, page 1175, Southern No. 2 Foundry was quoted at $20.50. This should have read $23, Cincinnati. We make this correction in justice to those who base sales for the current month on these quotations.

Philadelphia.

PHILADELPHIA, PA., November 13, 1906.

Iron and Steel prices are stronger, and possibly a little higher. The business being done, however, is not notably large, simply because there is hardly anything to sell. Practically all American Iron is taken for the first quarter, and for what little there is left for 1906 there is a veritable scramble to get a chance at it. This may be somewhat moderated by the arrivals of English and Scotch Irons. Only one cargo has arrived thus far, but in addition to four cargoes now afloat the following steamers have been chartered, all for Philadelphia: Stanhope, 5000 tons; Irismere, 5500 tons; Ada, 5700 tons; Wragby, 5000 tons, and Gadsby, 5000 tons. While it is said that about 10,000 tons of Scotch Iron have been engaged for shipment to New York, a considerable quantity is also booked for Boston. This ought to give relief to the seaboard markets, and in case the furnace report for October should be favorable it will do much to relieve the anxiety, which without such aid is probably not unfounded. The demand has certainly been extraordinary and the immediate outlook seems to demand more Iron than ever, so that unless supplies can be increased accordingly the stringency of the past several months may continue indefinitely. It may be noted that while the English market is 1s. 6d. to 2s. lower, the advance in freights is almost as much, so that as far as it concerns this market the cost from the other side would be nearly as high as ever.

Pig Iron.—It is not easy to quote prices, as they depend entirely on the circumstances in each particular case. As a rule, $23.50 to $24 is about the range for No. 2 X Foundry for this district for the first half of 1907, with 50 cents to $1 more for shipments during 1906. Middlesbrough No. 1 is quoted at $22.25 on dock, and No. 3 at $21.50, while Scotch is readily taken at $23.50 to $24. Low Phosphorus is quoted at about $26 to $26.50 on dock, with sales at $27 to $27.25 for small lots delivered to consumers at nearby points. Basic Iron is so scarce that it is practically all taken up until the middle of 1907, but buyers are so well covered that

there is no great demand beyond what is wanted to make up for short deliveries, which are unpleasantly frequent but difficult to avoid. In a case of this kind $21.80 was paid for 1000 tons, 1906 delivery. Notwithstanding the great advance in prices and the extraordinary sales, there are no indications of reaction, which is evidenced by the fact that prices are at the highest reached the past decade. Under such conditions it takes a good deal of courage to say that prices are going higher, yet many well-informed men are disposed to take that view of the situation. They say that they are certainly not going lower, and unless supplies are larger than appearances indicate nothing can prevent higher prices than have yet been realized. Nevertheless, they are already high enough to suggest caution, and with the enormous tonnages already engaged it can hardly be possible that there are many who have not made ample provision for their requirements for months to come, so that it revolves itself into a question of whether the furnaces can supply what they have contracted for, and on the dates specified. The course of the market is largely a matter of guess, however, and must therefore be left to work out its own salvation. Pending further light on the situation, prices are about as follows for the first and second quarter of 1907 for deliveries in eastern Pennsylvania territory, subject to 50 cents to $1 premium for anything that can be had in 1906:

No. 1 X Foundry	$25.00 to $25.50
No. 2 X Foundry	23.50 to 24.00
No. 2 Plain	23.00 to 23.50
Standard Gray Forge	20.75 to 21.25
Ordinary Gray Forge	20.00 to 20.25
Basic	21.00 to 21.50
Low Phosphorus	26.75 to 27.00
Malleable	22.00 to 23.00
Middlesbrough No. 1, on dock	22.25 to 22.50
Middlesbrough No. 3, on dock	21.50 to 21.75
Scotch, on dock	23.75 to 24.00

Ferroalloys.—No business of any consequence can be reported, although there are free offerings of Ferro at last week's prices, say $78 to $80, and for 1907 shipments $73 to $74 could be easily done. Ferrosilicon is now quoted at $103 to $105.

Steel.—The Steel trade is in good shape, with plenty of demand at $33 to $34 for ordinary Rolling Billets, and $36 to $40 for Forging Billets.

Plates.—There is greater pressure than ever on the Plate mills. The disparity between the price of raw material and the finished article is so great that consumers, fearing an advance, are placing large orders to protect themselves. In some cases the tonnage accepted is less than the buyer would like; in others a slight advance is demanded, as a protection to the manufacturer, although officially prices are unchanged, as follows:

	Carload. Cents.	Part carload. Cents.
Tank, Bridge and Boat Steel	1.73½	1.78½
Flange or Boiler Steel	1.83½	1.88½
Marine	2.13½	2.18½
Locomotive Firebox Steel	2.23½	2.28½

The above are base prices for ¼-in. and heavier. The following extras apply:

	Extra per 100 pounds.
3-16 in. thick	$0.10
Nos. 7 and 8, B. W. G.	.15
No. 9, B. W. G.	.25
Plates over 100 to 110 in.	.05
Plates over 110 to 115 in.	.10
Plates over 115 to 120 in.	.15
Plates over 120 to 125 in.	.25
Plates over 125 to 130 in.	.50
Plates over 130 in.	1.00

Structural Material.—There is nothing outside the general routine, although there is plenty of business to keep everything moving. Prices are considered a little out of line with the high prices for raw materials, but business can be done at the old prices and in most cases good deliveries can be had at 1.83½c. to 2c. for Beams, Channels and Angles, according to specifications.

Bars.—The demand is good, without being unusually active. Plenty of business could be had by shading prices a half tenth or so, but with the steadily increasing cost of raw material manufacturers of Best Refined Iron think they ought to do better than 1.83½c., rather than to accept less. Steel Bars are stronger, and to get reasonable deliveries 1.83½c. would be an inside quotation.

Sheets.—The demand is satisfactory at the following prices for carload lots and a tenth additional for smaller quantities: Nos. 18 to 20, 2.60c.; Nos. 22 to 24, 2.70c.; Nos. 25 and 26, 2.80c.; No. 27, 2.90c., and No. 28, 3c.

Old Material.—The demand for Old Material is of an irregular character; some articles are materially higher, while others are unchanged. Pittsburgh and Buffalo are competing for such articles as Stove Plate and Cast Borings, so that it is impossible for consumers on the seaboard to do better than $16 to $16.50 and $14 to $14.50, respectively. Bids and offers for delivery in buyers' yards in this district for the general list are therefore about as follows:

Steel Crops	$19.50 to $20.00
No. 1 Steel Scrap	18.50 to 19.00
Low Phosphorus Scrap	23.00 to 24.00
Old Steel Axles	23.50 to 24.50
Old Iron Axles	31.00 to 31.50
Old Iron Rails	26.00 to 26.50
Old Car Wheels	21.50 to 22.50
Choice Scrap, R. R. No. 1 Wrought	22.00 to 22.50
Choice No. 1 Yard Scrap	19.50 to 20.00
Long and Short	18.50 to 19.00
Machinery Scrap	19.25 to 19.75
Wrought Iron Pipe	16.50 to 17.00
No. 1 Forge Fire Scrap	16.50 to 17.00
No. 2 Light Ordinary	11.50 to 12.00
Wrought Turnings	14.75 to 15.50
Axle Turnings, Choice Heavy	16.50 to 17.00
Stove Plate	16.00 to 16.50
Cast Borings	12.50 to 13.00
Grate Bars	13.50 to 14.00

Cleveland.

CLEVELAND, OHIO, November 13, 1906.

Iron Ore.—The movement of Iron Ore down the lakes next year is likely to reach 40,000,000 tons, and if some of the steel companies ship their full proportion the aggregate might exceed this figure considerably. It is now agreed that the ore for 1907 delivery has about all been sold. This was done without the solicitation of any orders on the part of the shippers, the consumers making a rush to cover their needs. The buying movement started a week ago Monday and was practically completed by Saturday night. A few deals are still pending, which will be closed up during this week, but they are for small amounts. It is now realized that most of the Ore that can be produced during the year 1907 has already been sold. The prices quoted a week ago applied upon about all of the sales. There is, as stated at that time, a reduction in the iron content of the base Ore which will make the actual increase more than the base prices for 1906 and 1907 indicate, the increment on this account being 15 to 20 cents a ton. The base prices are as follows: $5, f.o.b. Lake Erie ports for Old Range Bessemer; $4.75 for Mesaba Bessemer; $4.20 for Old Range Non-Bessemer; and $4 for Mesaba Non-Bessemer. It is found there are some new buyers in the market, but they are few. Eastern furnaces, depending in part upon other supplies, are larger buyers of Lake Superior Ores this year than formerly. It is found that almost every consumer put in his application for a larger supply of Ore than he bought for this year's delivery. The sales were really an apportionment of the Ore among the consumers. The undetermined factor in the situation is the lake freight rate for the coming season. It is considered that this will be practically unchanged from this year and that contracts will be made before the close of this year. The estimates on the movement for 1906 have been revised radically since the publication of October figures, and it is now believed the total will reach 37,500,000 tons by the all lake route.

Pig Iron.—The Foundry Iron market has been exceptionally strong the past week. Prices have continued to rise under the shortage of Iron until second quarter and first half Iron are selling close to the basis for immediate delivery. There is a semipanic among consumers in this territory over the evident shortage of Iron, both for early and future delivery. Many are facing the necessity of importing Iron, which, of course, would disturb their operations by introducing new elements into their mixtures. The effort to cover their needs for the brands of Iron with which they are familiar has brought about the tension in the market and a situation in which prices are boosted without any question being raised. The willingness with which consumers are paying present prices is really disconcerting to the Pig Iron interests, who fear the consequences of such an urgent demand. For immediate shipment No. 2 Foundry is selling at $25 or even higher at the furnace. In one instance a block of No. 1 Iron was sold at $26 at the furnace. This was for delivery during the remainder of this year. The same furnaces are refusing to take any orders for Iron for delivery during the first quarter of next year and insist that all contracts shall be made to cover the first half. Even then they have no large amounts of Iron to sell. The market is rapidly reaching the point where $23 at the furnace will be paid generally for first half delivery. Some furnaces are still selling at $22. About the same condition obtains in the Basic and Bessemer markets. Spot Iron is almost entirely out of the question. The lowest figure that has been heard on first half delivery is $21 in the Valleys for Basic, and now some of the furnaces are selling at $22 to $23 in the Valleys for the first half, while such small amounts as are sold for spot shipment bring $25 to $26 in the Valleys. About the same conditions obtain as to Bessemer, the supply of which is exceedingly short.

Coke.—The market is exceptionally strong, prices advancing slightly on contract, although holding steady for immediate delivery. The best grades of 72-hour Foundry Coke are now selling on the basis of $4 at the oven for prompt shipment and $4.25 on contract at the oven. Furnace Coke is also strong at $3.35 to $3.50 at the oven for early shipment.

Finished Iron and Steel.—Conditions have not changed greatly in the past week, except that mills in some lines are farther behind with orders than at any time in the past few months. The increase in the price of Sheets is seen to have had no effect whatever on the buying movement, which is as

strong as ever. The mills on the average are now about three months behind their orders and no deliveries are promised inside that time. Prices out of stock are now 2.15c. for No. 10 Blue Annealed, 2.90c. for No. 28 One Pass Cold Rolled and 3.90c. for No. 28 Galvanized. Billets are still very scarce, but prices vary widely, according to the delivery. One sale of Forging Billets has been reported at $38.50, delivered, while other sales have run up as high as $40 a ton, delivered. For 60 to 90 days' delivery $35 and $36 a ton, Pittsburgh, have been paid. Bar Iron is now selling at 1.70c. to 1.75c., Pittsburgh, and Bar Steel Bars are strong at 1.60c., Pittsburgh, for Bessemer and Open Hearth.

Old Material.—Buying is very strong at present, the market keeping pace with new material. The supply has been sufficient, however, to keep the prices about steady. The following represent dealers' prices to the trade, f.o.b. Cleveland, gross tons: Old Steel Rails, $18 to $19; Old Iron Rails, $25.50 to $26.50; Iron Car Axles, $21.50 to $22.50; Heavy Melting Steel, $18 to $19. Net tons: Cast Borings, $9.50 to $10.50; No. 1 Busheling, $15.50 to $16; No. 1 Railroad Wrought, $18 to $18.50; No. 1 Cast, $17; Iron and Steel Turnings and Drillings, $12 to $12.50.

The German Iron Market.

BERLIN, November 1, 1906.

The strength of the price situation in the Iron industry, as mentioned in my last letter, has been fully maintained. Advances have even become still more general since then. At a meeting of the Steel Verband last week the price of half rolled Steel goods was put up 5 marks the ton, and this advance applies also to Structural Shapes. The Rhenish-Westphalian Girder Dealers' Association has this week announced a similar increase on Structural goods. Advances on Pig are also the order of the day. The Düsseldorf Syndicate has this week raised the price of Foundry No. 3 2 marks for the Rhenish-Westphalian District and 3 marks for North Germany. For the latter territory the price of Hematite Iron was also put up 3 marks, but left unchanged in the district itself. Foundry No. 1 was raised 3 marks for the regions near the furnaces and 4 marks for North Germany.

The Verband's Report.

The production report of the Verband for September makes an unusually poor showing owing to the prolonged strike at the Rothe Erde Works at Aachen, mentioned in my last report, and to curtailments of output at several other establishments through breakage of machinery and the necessary repairs. Happily, however, the strike broke down at Rothe Erde and work was resumed at about full speed last week. As this concern is a very important producer, its resumption of work must help greatly in relieving the present scarcity of Steel material and in swelling the figures of production henceforth.

The Verband's sales of half finished Steel in September were only 138,280 tons. This was 9100 tons lees than in August, and was the smallest since February, 1905. Steel Rails and other railroad Steel reached 148,528 tons, or 2170 tons more than in August, but 30,600 tons less than in May, which is the record month for this specialty. Sales of Structural Shapes amounted to only 156,669 tons, or 27,250 tons less than in August and 33,300 tons in July, which was the banner month. The total shipments of the Verband in the above lines were over 7 per cent. below those of August, but for the first three-quarters of the year reached 4,300,570 tons, which means a gain of 468,054 tons, or 12.21 per cent. over the corresponding period of 1905.

The report given out by the Verband says that the works were employed to their full capacity, and in many cases in spite of their utmost exertions they were not able to fill contracts on time. The orders held up through the strike at Rothe Erde and the stoppages referred to could only to a very small extent be placed with other works. In half finished Steel home consumers have covered their needs till the end of March. The calls for shipments on contract are extraordinarily brisk and cannot in all cases be responded to. The foreign demand is firm, but the Verband continues its policy of restricting its foreign business in favor of home consumers. Home orders for Rails guarantee abundant work for the mills till far into next year. The foreign demand continues very active and some large orders for Heavy Rails have been taken. Work on Grooved Rails remains heavy and a number of municipal street railroads have recently placed orders. The same state of activity is noted in Rails for mines, many of which are negotiating for next year's supplies. The prices paid by foreign buyers are now equal to home prices, but the long terms of delivery which the German mills are compelled to stipulate have prevented the placement of some orders. In Structural Steel the home demand has been extremely active the past four weeks owing to the fact that dealers' supplies were exhausted, and they hurried forward new orders at a rapid pace in anticipation of higher prices. Foreign business has greatly improved since the end of September, but in these lines, too, the long terms of delivery demanded tends to restrict orders. Work for four months is guaranteed by orders on hand.

The Activity Unabated.

Later market reports indicate that the activity in all directions remains unabated. In Old Iron business is very brisk at higher prices. Consumers of Pig and half finished Steel are greatly embarrassed through scarcity of those materials, and some small establishments have actually been compelled to shut down temporarily for that reason. The pressure of work at Rail mills is the greatest ever known, and there is an extremely heavy demand for supplies used in building cars. In the latter large orders from France and Italy are on hand, in addition to the immense quantities called for by the Prussian roads.

In Soft Steel Bars prices range between 147.50 and 150 marks, but the amount of orders placed at these recently fixed prices is not yet very large. This delay in ordering at the new prices, however, causes mill owners no concern, in view of the prodigious orders already on hand. The foreign market for these goods is also firm, but buyers hesitate in placing orders, since the recent rapid advance in prices has evidently awakened the hope that these cannot be maintained long. The market for Wrought Bars is very strong. The works have unusually heavy orders and will remain well employed for a long time. Consumers are beginning to place orders at the increased prices as recently fixed. Specifications for orders representing several months of work are on hand.

Rolled Wire is scarce notwithstanding the heavy production. The mills are trying to induce the Steel Verband, as indicated above, to increase their allotments, and as they must pay the Verband 20 marks the ton on any excess of production above their allotments they are very careful to keep within their allotments and consumers must suffer. The Rolled Wire Association will hold a meeting next week to discuss an advance of prices to compensate for recent increases in the prices of materials, and they will almost certainly mark up prices. Manufacturers of Drawn Wire have enormous orders on hand, reaching into the second quarter of 1907, and prices have now risen to a point where profits are good.

The Wire Nail Trade

is suffering from unrestricted competition, the organization of the manufacturers having fallen to pieces several months ago. Prices are quite irregular, ranging between 14.75 and 16 marks per metric hundredweight. There is no ground for cutting prices as some works are doing, since orders are coming in very satisfactorily and the general level of prices has much improved. The mills have taken large orders for next spring. Heavy amounts have been booked for China and Japan.

The scarcity of Pig Iron has been intensified through the fact that several furnaces which had been driven under too high pressure had to be blown out for repairs. The production for nine months reached 9,216,093 tons, as compared with 7,963,596 tons for the like period of 1905. The increase was equal to 16.44 per cent. Since the year 1885 there has been only one year when the increase was as heavy as now—namely, the year 1903—when an extraordinary American and English demand caused an unusually rapid expansion in the German Iron output. Latterly some new furnaces have been blown in and indications point to new record figures for the remaining two months of the year.

Large Dividends.

Iron companies have continued for several weeks publishing their annual reports for the fiscal year ended June 30, and nearly all of these show large increases in dividends. The utterances at stockholders' meetings in regard to the prospects for the current year are mostly of a very cheerful tone. Notwithstanding all this, however, Iron and Coal shares have lost considerable ground on the stock exchanges the past two months. A striking feature of these annual reports is the large sums set aside by the great Iron and Coal companies for new construction, modernizing machinery and enlargement of plants. The fact has recently been commented upon that eight of these great companies have thus set aside a total of above $10,000,000, besides unusually large sums written off upon their plants.

Conditions in the metal working trades of Berlin are aptly illustrated by the following case told me by a manufacturer of certain electrical specialties. He tried to place a very heavy order for certain small castings which he wanted delivered regularly in large lots during the next six or eight months. He went to one great foundry after the other, but was not able to find one that was willing to touch the order under six months.

The Coal scarcity has not been relieved since my last letter was written. On the other hand, the car famine has now reached a more acute form than at any time this year. The shortage in the Rhenish-Westphalian district now ranges between 3000 and 4000 cars a day (capacity 10 tons). Some mines shut down till cars are put at their disposal. A great strike of Coal miners has been feared for several weeks, but this cloud seems now about to blow over. Mine owners were able to show that a considerable increase of wages had already occurred. The average wage in the Dortmund district rose from 4.08 marks per shift at the beginning of the year to 4.66 marks in August.

Metal Market.

NEW YORK, November 14, 1906.

Pig Tin.—While there has been a fair demand the price changes have moved within narrow limits. The low price of the week, 42.50c., was made on Thursday after which the market advanced, reaching 42.65c., on Friday. The stimulus given by the buying of a large electrical manufacturer on Monday carried the price to 42.75c.; on Tuesday sales were made at 42.60c., and higher figures. To-day following the advancing prices in London sales were made at 42.65c. The influence of the largest consumer is being felt to a considerable extent, and if it should, as it is rumored, export 450 tons on the Minneapolis in addition to the 98 tons which was returned to Europe on the Mesaba, there is every danger of a squeeze in November Tin Plate this month in this country. The import statistics show this clearly. There has been received so far this month 2030 tons, with 2375 tons to arrive, not all of which will make this month's delivery, so that the loss of 550 tons reshipped will be keenly felt. The market is about on a parity with the London market, which closes higher to-day at £194 15s. for spot and £196 5s. for futures. The market seems to be in a much firmer position than a week ago, and the known fact that the metal in this country is concentrated in strong hands has its sentimental influence.

Copper.—The market is very quiet, but prices are firm. The influence of the high prices is being felt all over the world, and more metal is being brought to this country to be refined. A sale of Electrolytic was made at 22¼c., but higher prices could probably be obtained for any large quantity. Prime Lake is quotable at 22½c. upward, while Casting cannot be had at less than 22c. The foreign demand is excellent, and while consumers abroad are not disposed to make large commitments still they are continually making small purchases. American consumers are also not disposed to buy large quantities, but prefer to buy only as their needs warrant. The exports are good, amounting to 6140 tons for the first 13 days of this month. The London market is higher, closing to-day at £99 10s. for spot, £100 17s. 6d. for futures and £105 for Best Selected.

Pig Lead.—The market is firm at 6c., New York, and sales have been made at 6.05c. In St. Louis prices are unchanged at 5.90c., and Lead is hard to obtain at that. The American Smelting & Refining Company is experiencing considerable difficulty with its shipments, being much belated on account of the car congestion.

Spelter.—A heavy demand from galvanizing works and Brass mills has advanced the price about 15 points. Prime Western brands are quoted at 6.45c. to 6.50c., New York, and 6.35c., St. Louis.

Antimony.—The London market advanced £3 to-day and prices have been marked up in New York. Cookson's is now quoted at 25¾c. to 26c., Halletts' at 25c. and outside brands at 24¾c. to 25c.

Ferroalloys.—There is a heavy demand for both Ferromanganese and Ferrosilicon, the former being quoted at $82, Pittsburgh. Ferrosilicon is higher, $106 being quoted for November shipment from Europe. For January and February deliveries it can be had at the old price of $104. Ferrochrome is unchanged at $150.

Tin Plates.—Welsh Plates are 1½d. higher, at 14s. 1½d., due to an advance in Steel Bars. The New York market is firm at $4.09 for 100-lb. IC Coke Plates. In Pittsburgh prices are unchanged at $3.90, subject to the usual trade discounts.

Old Metals.—There is a good demand, dealers' selling prices being as follows:

	Cents.
Copper, Heavy Cut and Crucible	21.00 to 21.50
Copper, Heavy and Wire	20.50 to 21.00
Copper, Light and Bottoms	18.75 to 19.00
Brass, Heavy	15.00 to 15.50
Brass, Light	12.00 to 12.50
Heavy Machine Composition	19.00 to 19.50
Clean Brass Turnings	13.75 to 14.25
Composition Turnings	16.75 to 17.25
Lead, Heavy	5.75
Tea Lead	5.50
Zinc Scrap	4.75

It is stated that the general use of compressed air in boiler shops, which has largely aided in advancing boiler shop practice to the front rank in railway mechanical departments, is being extended in some shops to include the cleaning of crown bars and crown sheets with a sand blast. It is claimed that this gives much more satisfactory results than the old method of hammer and chisel. In a certain shop where the new method has been installed a dozen bars took a man ten hours under the discarded system, at a labor cost of $1.75. With the sand blast a bar is cleaned in 20 or 30 min., or about half the former time, and the job is a cleaner one when done. This same shop uses the blast with satisfactory results for cleaning the crown sheet as well.

New York.

NEW YORK, November 14, 1906.

Pig Iron.—There has been quite an active market, for all deliveries in lots running up to 2000 tons, at prices which have been working up a little on domestic Irons and considerably on foreign Irons. A number of additional cargoes of Middlesbrough and Scotch Irons have been purchased for shipment by importers, and, generally speaking, consumers are showing more interest in supplies of foreign Iron for forward delivery. Scotch No. 1 is selling at $23 to $24 from vessel's side, duty paid at Philadelphia, New York or Boston, while No. 1 Middlesbrough is quoted on the same basis at $22.50 to $23, and No. 3 at $21.50 to $22. While on the face of it these figures are considerably below the tidewater quotations for domestic Iron, and more particularly for Boston delivery in reality, adding incidental costs of reaching the consumer, they are pretty nearly equal. In Boston this is notably the case. The Custom House authorities will only weigh shipments in block, and will not weigh separately the parcels to individual buyers. This means to the importer an additional weighing charge of 10c. to 15c. per ton. Then there are 25c. for loading and 40c. for switching, making a total of 75c. to 80c. per ton. We quote for Northern Iron, at tidewater, for spot, for No. 1 Foundry, $25 to $26, and for No. 2 Foundry, $24.50 to $25. For delivery during the first half we quote No. 2 Foundry $23.50 to $23.75, and for the second quarter $22 to $23. Southern Irons are selling at $25 to $26 for spot, No. 2 Foundry $23.50 to $24 for first quarter, and $22 to $23 for second quarter.

Steel Rails.—The principal contract closed in the past week was for the South & Western Railroad, its order for 27,500 tons being divided between the Carnegie Steel Company and the Pennsylvania Steel Company, the former receiving 17,500 tons. The Toledo, St. Louis & Western has bought 7500 tons and the Louisville & Eastern 5000 tons. Some large business is still pending, chiefly for Eastern and Southern roads.

Structural Material.—No large business has been placed in the past 10 days. The principal new railroad inquiry in the week is one for 5000 tons of bridge work for the Lackawanna Railroad. Lewis F. Shoemaker & Co., Philadelphia, have received an order for 2000 tons of bridge work for the Pennsylvania Railroad. A canvass of the situation by large contracting interests shows an immense tonnage under consideration, both in railroad and building lines, particularly in the latter, but much of this business will not develop before springtime. Financial considerations will cut a figure in many cases. In New York City the tonnage of prospective buildings that have not gone beyond architects' offices is light just now. Construction for manufacturing purposes keeps up fairly well, however, in all parts of the country. The bridge works are all making large outputs. The Ambridge plant of the American Bridge Company turned out 21,000 tons of fabricated Steel in October. Most large buyers of Structural Material have covered for months ahead, a good many of them up to July 1, 1907. Specifications on all these contracts are coming forward in good volume. We continue to quote on tidewater deliveries, mill shipments, as follows: Beams, Channels, Angles and Zees, 1.84½c.; Tees, 1.89½c.; Bulb Angles and Deck Beams, 1.99½c. On Beams 18 to 24 in. and on Angles over 6 in. the extra is 0.10c. Sales out of stock of material cut to length continue to be made at 2¼c. to 2½c.

Bars.—The market continues strong, with Best Refined Iron quoted on the basis of 1.70c., Pittsburgh, or 1.84½c., tidewater, as the minimum price on standard specifications. Some manufacturers quote $1 per ton more. The active Bar Iron mills in the East are now getting some accessions to their ranks from mills whose men have recently been on strike. Some good sized mills resumed operations on Monday of this week, having effected settlements with their men. The demand for Bar Iron at present appears sufficient to absorb the additional productive capacity thus made available. Steel Bars are in good demand, and quoted at 1.64½c. to 1.84½c., tidewater, depending on the time of delivery.

Plates.—The market is gradually working into a stronger position. Orders are coming in so freely and the cost of raw material continues to advance so steadily that manufacturers are in a number of cases endeavoring to secure higher prices on all classes of Plates. No unanimity now prevails as to prices, as some manufacturers continue to quote the official schedule, while others are asking $2 per ton advance, especially on orders on which reasonably early shipments are desired. Quite a volume of new orders has been entered the past week, and a great deal of figuring is being done on new inquiries. Quotations on general business are as follows at tidewater on carload shipments: Sheared Tank Plates, 1.74½c. to 1.84½c.; Flange Plates, 1.84½c. to 1.94½c.; Marine Plates, 2.14½c. to 2.24½c.; Firebox Plates, 2.24½c. to 2.60c., according to specifications.

Cast Iron Pipe.—A great deal of business for next year's delivery is pending and negotiations are under way

which may be concluded by the close of the current month or early in December for important consumers of Pipe, among whom are gas companies in various parts of the country. Reports are current of an inquiry for about 20,000 tons of Cast Iron Pipe for Cuba, but it is not believed that the work contemplated would require more than 4000 tons, and as far as can be ascertained no expectation is held that the contract will be closed at an early date. While some important foundries are well covered into next year, others are still in a position to consider business for the first quarter's delivery, but all are exceedingly firm as to prices. For anything like early delivery carload lots of 6-in. Pipe would command $36.50 per net ton at tidewater, and from that price down to $33.50 is quoted for contracts running into 1907.

Old Material.—The strongest demand is still shown in Heavy Cast Scrap and Stove Plate. Cast Borings and Wrought Turnings are also selling freely, and fully 25c. per ton more can be obtained for them than a week ago. A strong demand is experienced for Heavy Melting Steel Scrap from several localities. The prices realized in some quarters are 50c. to $1 per ton higher than the ruling rate in Eastern Pennsylvania. Car Wheels are scarce and easily command 25c. to 50c. more than last week. No. 1 Yard Wrought has been somewhat neglected, but a few good sales have been made in the past two or three days. No. 1 Railroad Wrought is also improving and the most recent sales have been made at 50c. per ton more than previous prices. The whole Scrap position is exceedingly strong, with excellent indications of higher prices on all grades in the near future. Approximate prices per gross ton for New York and vicinity are as follows:

Old Iron Rails	$24.50 to $25.00
Relaying Rails	28.00 to 28.50
Old Steel Rails, rerolling lengths	18.50 to 19.00
Old Steel Rails, short pieces	16.20 to 16.75
Heavy Melting Steel Scrap	16.25 to 16.75
Standard Hammered Iron Car Axles	29.00 to 30.00
Old Steel Car Axles	22.00 to 22.50
No. 1 Railroad Wrought	21.00 to 21.50
Iron Track Scrap	18.00 to 18.50
No. 1 Yard Wrought, long	18.50 to 19.00
No. 1 Yard Wrought, short	18.00 to 18.50
Wrought Pipe	14.50 to 15.00
Light Iron	10.00 to 11.00
Cast Borings	10.00 to 11.00
Wrought Turnings	13.00 to 14.00
Old Car Wheels	20.00 to 20.50
No. 1 Machinery Cast	17.50 to 18.00
Stove Plate	14.50 to 14.50
Grate Bars	13.00 to 13.50
Malleable Cast	18.00 to 19.00

William B. Ilko, who has been employed for the past 12 years by Henry A. Hitner's Sons, Philadelphia, dealers in Scrap Iron and Metals, has been appointed general manager of their branch office, located at 32 Broadway, New York City. The firm is well known in the trade as a dismantler of railroads, buildings, bridges, steamships, &c.

Iron and Industrial Stocks.

NEW YORK, November 14, 1906.

The stock market has been rather quiet since last week's report, influences being unfavorable to the interests operating for higher prices. The chief factor in discouraging operations has been the steadily advancing interest rate on call loans. On Monday the rate touched 20 per cent. On that day the lowest prices were reached for the period under consideration. From Thursday of last week to Monday of this week the range of prices on active stocks was as follows, the high point of the period having been reached usually on Thursday and the low point Monday morning: Car & Foundry common 42 to 43¾; Locomotive common 71½ to 74¾, this stock having sold ex-dividend since Friday; Colorado Fuel 51 to 52⅝; Pressed Steel common 50¾ to 54; Railroad Spring common 51¼ to 52¼, this stock having proved an exception to the general course of stocks and having advanced from Thursday to Saturday; Republic common 34½ to 36, preferred 97 to 98; Sloss-Sheffield common 71 to 74; Tennessee Coal 153½ to 161; Cast Iron Pipe common 45¾ to 47½; United States Steel common 45½ to 47⅜, preferred 104 to 105⅛; Can preferred 54 to 54¾. The market recovered to some extent on Monday afternoon, and the improvement continued on Tuesday. Last transactions up to 1.30 p.m. to-day are reported at the following prices: Car & Foundry common 43½, preferred 100; Locomotive common 72½, preferred 112; Steel Foundries common 9⅞, preferred 44¼; Colorado Fuel 51½; Pressed Steel common 52⅝, preferred 98¾; Railway Spring common 52¼; Republic common 35, preferred 97¼; Sloss-Sheffield common 71½; Tennessee Coal 158; United States Cast Iron Pipe common 46⅜, preferred 88½; United States Steel common 46⅞, preferred 104¾; Can common 6, preferred 54.

Dividends.—The Alabama Consolidated Coal & Iron Company has declared the regular quarterly dividend of 1¾ per cent. on the preferred stock, payable December 1.

The Niles-Bement-Pond Company has declared the regular quarterly dividend of 1½ per cent. on the preferred stock, payable November 15.

The Pratt & Whitney Company has declared the regular quarterly dividend of 1½ per cent. on the preferred stock, payable November 15.

Large Orders for Allis-Chalmers Engines.—The Allis-Chalmers Company, Milwaukee, Wis., through its Pittsburgh office, J. Weidman Murray, manager, has recently sold quite a number of power units, both steam and gas engines, for rolling mill and blast furnace duty, besides an enormous lot of smaller units for various power purposes. Among them were 14 blowing engines for the Edgar Thomson blast furnaces of the Carnegie Steel Company; eight of the same size and type for the Republic Iron & Steel Company's Thomas plant at Thomas, Ala.; three of the same type for the Shenango Furnace Company, Sharpsville, Pa.; 10 pairs of compound blowing engines for the four new blast furnaces to be built by the Jones & Laughlin Steel Company near Beaver, Pa., and two compound steam blowing engines, four twin tandem gas driven blowing engines to the Carrie furnace department of the Carnegie Steel Company. Each of the last named is fitted with four 42 x 54 in. gas cylinders and two 54 x 68 in. air cylinders. To the same department of the Carnegie Company have also been sold three twin tandem gas driven electric engines, each engine driving a 2000-kw. Allis-Chalmers generator. The company is also furnishing to the Carnegie Steel Company for its Homestead Steel Works two tandem compound condensing mill engines and two similar engines for its Edgar Thomson Steel Works, the shipping weight of each of which will be approximately 900,000 lb. The company is also building for the Sharon works of the Carnegie Steel Company one twin tandem compound condensing reversing mill engine fitted with two 42-in. diameter high and two 70-in. diameter low pressure steam cylinders, each 54 in. stroke, the shipping weight of which will be approximately 1,400,000 lb.

In a discussion before the Institute of Mechanical Engineers upon the behavior of materials under shear, reference was made to the well-known phenomenon of there being less metal in the punching from a thick boiler plate than the volume of the hole punched. The specific gravity of a number of such punchings was measured and found to be practically identical with that of the plate; in fact, such slight difference as did exist showed the punchings slightly less dense than the plate. It was suggested that the metal was displaced into the plate in a narrow ring surrounding the hole, thus slightly thickening it in such an annular ring. This phenomenon is quite pronounced in thick plates, but is not appreciable in thin plates.

F. H. Brown, president of the Brown & Zortman Machinery Company, Pittsburgh, Pa., has sold his interest to his partners, who are Robert Wray, vice-president, and M. S. Zortman, secretary and treasurer. He also resigned his position as chairman of the Machinery Committee of the National Supply and Machinery Dealers' Association, as well as the vice-presidency of the Pittsburgh Machinery and Supply Dealers' Credit Association. He has not determined as yet upon his movements for the future, but from his recognized business ability and energy he will undoubtedly be heard from in some connection of importance.

The Scranton Bolt & Nut Company, Scranton, Pa., is now running every department at full capacity, having started on Monday. The rolling mill had been closed by a strike since July 1, and recently the trouble extended to the bolt and nut factory. A settlement of the matters in dispute was effected last week.

The Reading Iron Company, Reading, Pa., reports the situation at its works unchanged. The puddling mills, which were closed by a strike July 1, are still idle.

J. A. Farrell, president of the United States Steel Products Export Company, sailed for Europe on the Oceanic November 7.

George Rea, who has been connected with the Buffalo office of Rogers, Brown & Co., pig iron merchants, has been appointed representative at the New York office.

The Machinery Trade.

NEW YORK, November 14, 1906.

During the week a large number of substantial inquiries for machinery, including extensive lists of tools, were received which have increased the already great demand to the extent that reasonable delivery is getting next to the impossible. Deliveries are now so far in the future that good sized premiums can be obtained on tools for early delivery. This opportunity to make larger profits on their tools by favoring some with delivery is not being taken advantage of by machinery manufacturers and dealers and no such transactions have come to light, though exceptional prices are being received for second-hand equipment, especially that which has been used but little. The large business and the willingness on the part of buyers to pay the increased prices for machine tools have stiffened prices to the extent that manufacturers are not inclined to make much reduction on large orders, a prominent house having for such reason turned down an order for over $150,000 worth of machinery a few days ago. The largest inquiry received this week was the $250,000 machine tool list sent by the General Electric Company, the tools being required for its Lynn, Mass., works. While the railroads have done some buying they have not been especially important factors in this market. In the West, however, they are displaying considerable activity, the Chicago, Burlington & Quincy Railroad having issued a list covering 75 machine tools. The Illinois Central Railroad is in the market for 25 tools and other equipment, and other railroads are planning to buy additional machine tool equipment.

The existing shortage of freight cars and the activity on the part of car builders to supply the demand has resulted in a clamorous call for machinery used in building cars of both wood and steel. The big railroads failing to get deliveries from the car builders have added to the demand by calling for machinery to increase their own car building equipment, and to make matters more interesting for the machinery men the new companies formed for making steel cars are anxious to get into the field as soon as possible and are demanding early deliveries. This is particularly the case in the blacksmith shop equipment line, and the manufacturers of bolt and rivet machinery, forging equipment, upsetters and the like are under a tremendous strain to get out their orders. Manufacturers have been sending word to their agents to hold off orders as long as possible, and where a couple of months ago they were able to promise deliveries within a few weeks, conditions in that branch of the trade are now nearly as congested as in the machine tool line.

From all appearances there is no machinery line of consequence that has escaped the general rush of business, as inquiries in any branch of the trade bring the reply that the shops are behind. A prominent pump manufacturing company is eight months behind in its deliveries, and only last week a traveling man for a company manufacturing conveying machinery of the smaller type started on a tour through the West with the avowed intention of getting some customers to either extend the delivery time or cancel their orders.

The inquiries received from Canada indicate that the machinery trade in that country is in a prosperous condition. Houses in this city have been asked to quote on machines upon which there is a very high duty, and representatives are now here to buy machine tool equipment. It will be remembered that several large plants were established in Canada last year to supply that market, but it is evident from the inquiries that those plants have not sufficient capacity to supply the demand for machinery.

A traveling man representing one of the large machinery houses who recently returned from a business trip through Mexico is enthusiastic over the outlook for business in that country. The invasion of capital from this country, he said, has produced an unprecedented demand for machinery equipment, especially in the mining machinery line, and notwithstanding the climatic conditions there is more manufacturing going on there than ever before. He said also that United States manufacturers are learning that it pays to give credit to the Mexicans, which heretofore has been the chief reason for German and British success in Mexico.

Owing to the increase in the prices of iron, copper, and other material the General Electric Company, Schenectady, N. Y., has advanced prices from 5 to 10 per cent. on electrical machinery, the advance to take effect at once. The apparatus in which the raw material is an important part, such as turbines, generators, heavy motors, &c., has received the greater advance. Prices on apparatus in which the raw material is of little consequence, but on which the labor is the chief cost of production, have not been increased. In this connection it is stated that the demand for electric machinery has been very large and many of the shops are months behind on delivery.

Representatives of the Canadian Locomotive Company, Kingston, Ont., were in this city the past week buying considerable machinery to equip the proposed addition to its plant. The new building will practically double the company's present capacity.

The Canadian Iron & Foundry Company, Limited, Fort William, Ontario, which operates a half dozen works for the manufacture of cast iron pipe, valves, hydrants, car wheels, castings, &c., is to erect a new plant for which it will purchase a quantity of electric equipment, direct driven pressure blowers, general equipment for machine shop and foundry, electric traveling cranes, pneumatic hoists, compressor, induced draft blower, industrial railway equipment and such other machinery as is used in a large general and special foundry plant. There will be four 72-in. cupolas, with two positive pressure blowers, direct connected to electric motor, and the current will be 2200 volts, three phase, 60 cycle, alternating. The cranes will be 220 volts direct current. The company will install its own motor generator sets. The head office is in the Canada Life Building, Montreal, P. Q.

Orford Copper Company's Improvements.

The Orford Copper Company, 43 Exchange place, has in course of construction at Bayonne, N. J., a large addition to its plant, for which equipment is now being purchased in the trade here. Operations at Bayonne include the complete remodeling of the company's plant as well as a substantial enlargement, and the Ruggles-Coles Engineering Company, 39 Cortlandt street, New York, has charge of the work of construction. The structures include three large buildings of concrete forming the main body of the plant. One building will be 40 x 300 ft. and the other two will each be 83 x 300 ft. A notable feature of the two latter structures is that they will have 53-ft. spans in the center. There will be a charcoal building, 40 x 60 ft.; an oil house, 20 x 30 ft., and an electrolytic building, 72 x 300 ft. The latter building will be used among other things for office and storage purposes and will be two stories in hight, the second story being capable of supporting 400 lb. to the square foot. This structure will be equipped with several hand cranes. There will be a power house, 48 x 212 ft., and there will be coal pockets the full length of the structure. The plans show that there will be five pockets in all, and each will be 26 ft. deep. The plans include an irregular shaped building, about 42 x 119 ft., and there will be a new steel building over the reverberatory furnaces. This building will be 101 x 300 ft., and it is being constructed over an existing building, the task being especially difficult because of the fact that if water reaches the furnaces, which are in continuous use, the result will be dangerous. It is understood that the Orford Company is at present purchasing considerable coal handling apparatus, as well as some equipment for the power plant and some heavy crane requirements. The company expects to spend, it is declared, about $1,000,000 in the improvements under way, and a large part of this will go for machinery. Ernest Franke is the chief engineer at the plant and he is passing on the purchases which are made at the company's office through its purchasing agent.

On November 20 a special meeting of the stockholders of the Niles-Bement-Pond Company will be held to authorize an increase in the capital stock of from $5,000,000 to $8,500,000. This increase of capital is to be used principally for extending the company's works, although definite plans have not yet been decided upon. For some time the company has been doing such a large business that it could not take care of the orders offered, and is compelled to increase its capacity. The output of at least one of its works is already sold for 1907, and its other plants are considerably behind on deliveries. It is likely that plans for improvements will be taken up shortly after the special meeting, and that they will call for a large material increase to the present facilities.

The Chicago Pneumatic Tool Company will send out within the next few days an additional list of machine tools for equipping the extensions to its compressor works at Franklin, Pa. Only a few weeks ago the company sent out a small list of tools which have been purchased recently. The company is very much in need of larger facilities, and is making large additions to its plant, which it intends to equip with machine tools. The selection of the tools to be bought will be made by W. P. Pressinger, the manager of the compressor department, who is located at the New York office, 95 Liberty street.

Several inquiries have come to New York through the Pittsburgh office of an important machine tool house for equipment for the new plant of the Standard Steel Car Company, to be built at Hammond, Ind., for the manufacture of steel cars. The Standard Company has offices in the Frick Building, Pittsburgh, with works at Butler, Pa., and it has been a very heavy purchaser of equipment in the market, both here and at Pittsburgh, for some time past, for its Western plant. It is understood that its requirements have not all been arranged for. The company is having five large build-

ings erected and the new plant will be capable of turning out about 60 cars a day. It is understood that cars of wood and steel will be built in the plant, but most of the manufacturing will be confined to steel cars. The company has offices at 170 Broadway, New York, where J. B. Brady, the vice-president, is located, and although the New York office is principally a selling office it is understood that Mr. Brady has something to do with passing on the machinery purchases. Considerable equipment asked for at present is in the line of machinery for handling the steel work of the cars, especially in the blacksmith and riveting departments, &c.

Although considerable in the way of mechanical equipment has been recently purchased for the new plant now being constructed by the Arthur Koppel Company at Homewood, Pa., which is near Pittsburgh, there is a great deal more to be purchased to complete the equipment. The company is in the market for various materials and would be pleased to receive catalogues from manufacturers of drop forgings, cast chilled iron and cast steel wheels for narrow gauge, general machine structure and forge shop equipments, light rails with accessories, bolts, nuts, &c. The plant, which is being constructed under the supervision of the engineering firm of Dodge & Day, Philadelphia, will be quite extensive when completed. The company is hurrying to completion a section including the erecting shop, light car shop, switch shop and power plant, in order to get that part of the works in operation at as early a time as is possible. The request for catalogues comes through the company's Pittsburgh office, which has been moved to 1601 Machesney Building, 225 Fourth avenue. The main office is at 68 Broad street, New York.

John Harner, engineer, Burlington, N. J., is preparing plans for a new plant for the manufacture of cast iron gas and water pipe and light and heavy castings, to be erected at Bristol, Pa. The plant will consist of four foundries, a large machine shop, with other necessary buildings, most of which will be constructed of steel and brick. The daily capacity will be about 300 tons. It is understood that this plant is to be erected for the Standard Cast Iron Pipe & Foundry Company, which was recently organized by Philadelphia capitalists.

The American Locomotive Company is making purchases for the equipment of additions now being made to the Brooks Locomotive Works at Dunkirk, N. Y., and it is expected that before the winter is over all of the machinery needed at that plant will be arranged for and the additions will be put into commission by spring, if not before. It will be remembered that the company purchased about 50 acres of land adjoining the Dunkirk works, and the machinery now being purchased is for equipping the wheel shop and machine shop. Some purchases for these departments were made in the trade some time ago, but it was stated in these columns at that time that the buying was by no means completed. The present buying movement it is understood will about close out the requirements for the present improvements, although the large amount of land originally purchased by the company indicates that in the future there will be other extensions to the Dunkirk works.

The American Smelting & Refining Company, 71 Broadway, New York, has in course of construction at Point San Bruno, Cal., a copper smelting plant, which will cost about $1,000,000. A. L. Walker is the company's engineer in charge of the construction, and it is understood that there will be quite a large group of buildings erected in connection with the project. It is not thought that the purchases which the company recently made in the New York market covered the needs of this addition to its holdings, and it is highly probable that before long there will be some extensive inquiries from that source. As a matter of fact, the company is doing some buying now. From all accounts, the company has a number of Western projects in contemplation in addition to those now under way, and as heretofore most of its buying has been done in New York, the trade can expect some business. In this connection, it is understood, that bids will soon be taken on the power equipment for the San Bruno plant.

Plans are being prepared by Architect H. S. Kissam, 156 Fifth avenue, for five new warehouses, to replace those owned by the American Dock & Trust Company, 68 Broad street, New York, which were burned to the ground at Tompkinsville, S. I., last summer. The company proposes to spend about $750,000 on the new warehouses, and the construction will include the installation of considerable conveying and elevating machinery, as well as power apparatus. Those features have not been gone into as yet.

Large Power and Canal Work.

A project that will call for a large expenditure for machinery is that of the recently formed Western Power Company to establish a large hydro-electric plant on Payette River, near Oxbow, Idaho. Arthur Geisler, who has offices at 29 Broadway, New York, has been engaged as consulting engineer on the work and he will have the general supervision. The new plant will be about 20,000 hp. capacity and the power will be developed in four units. As yet no machinery has been purchased and only the general details have been arranged. Mr. Geisler is now in the West looking over the ground and will not return for several weeks. In the meantime complete plans will be arranged, and it is probable that when he gets back to New York arrangements will be made for purchasing machinery. The same company has under way the construction of a series of tunnels and runways to carry the water of the Feather River, in northern California, in order to develop an electric current of about 300,000 hp. The company is planning to construct a reservoir covering about 9000 acres near the head waters of the river. From the reservoir the water will be conducted though a tunnel 1½ miles long into a similar reservoir, from the outlet of which will be a 2000-ft. drop, at which point the power house will be located. A number of miles below there will be a second electric development. This project has been under way for more than a year, the work being carried on by the Feather River Power Company, which was recently reorganized under the name of the Western Power Company, with the following officers: President, Edwin Hawley of New York; vice-presidents, Frank H. Ray of New York and Philip Stockton of Boston; treasurer, Frank Thompkins of New York, and secretary, H. P. Wilson of San Francisco. The Board of Directors consists of A. C. Bedford, Edwin Hawley, F. H. Ray, Philip Stockton, F. W. Rollins, F. H. Davis, H. O. Wilson, J. N. Wallace and A. W. Burchard.

Bids have been asked until December 4 for the first large contract in connection with the Catskill water supply scheme, which is to cost when completed $161,000,000. The first contract will entail an expenditure of $5,000,000, and covers the construction of the initial portion of the aqueduct between this city and the Ashoken reservoir, a section 10¾ miles in length.

Bids were opened last week by the State Superintendent of Public Works, Albany, N. Y., on barge canal contracts Nos. 25 and 27. The Atlantic Gulf & Pacific Company, New York, which will do the work on contract 15 of the Champlain Canal, is the lowest bidder for contract 25, the company's figures being $1,754,236, which is a little below the State Engineer's estimate. The Kinser Construction Company, Chicago, Ill., is the lowest bidder for contract No. 27, its figures being $972,210, which is also slightly below the State Engineer's estimate. These contracts will probably be awarded within a few days.

The Board of Water Commissioners of Yonkers, N. Y., received bids on Thursday for a 1,000,000 gal. pumping engine for use at the municipal water works. The four lowest bidders were Henry R. Worthington, who offered a triple expansion direct connected compound tandem for $13,520, or a direct action engine with high duty attachment for $21,500; Fred M. Prescott Steam Pump Company, cross compound crank and flywheel high duty engine, $21,790; Marine Engine & Machine Company, cross compound crank and flywheel high duty engine, $22,900; Snow Steam Pump Company, same style engine, $23,800. The contract, it is expected, will be let within a week or two.

The Common Council of Orange, N. J., awarded contracts on Monday night for the new municipal lighting plant. The Crocker-Wheeler Company, Ampere, N. J., was given contract for the generators, engines, switchboards and 350 standard arc lamps. The Western Electric Company was awarded the contract for furnishing the line equipment. The Crocker-Wheeler Company's figure was $33,047, and the Western Electric Company's bid was $17,400. Work on the new plant will be begun as soon as possible.

Chicago Machinery Market.

CHICAGO, ILL., November 13, 1906.

Notwithstanding the heavy expenditures made by Western roads in the purchase of new equipment for shop extensions during the past year, several systems have again undertaken improvements that involve a large amount of machinery. The Chicago, Burlington & Quincy Railroad has issued a list comprising 75 tools for installation in different shops along its line, and the Illinois Central Railroad is in the market for 25 tools and other equipment. The Rock Island Railroad contemplates the erection of a new plant at Danville, Ill., while the Grand Trunk has plans under way for shops at Battle Creek, Mich. The Big Four will shortly issue a large list of machinery for the new shops at Indianapolis. The Chicago, Milwaukee & St. Paul Railroad is just completing its purchases of nearly 100 tools for its machine shop extensions at West Milwaukee, Wis., the entire expenditures aggregating about $150,000, four of the largest tools having been purchased at a cost of nearly $50,000. With regard to deliveries machine tool builders are becoming more crowded every day and with the exception of upright drills shipments cannot be made in less than four to six months. One large milling machine manufacturer in the west whose plant

has a capacity of 65 machines annually, has orders on his books for 35 tools and he is therefore in no position to make delivery in less than six months. The erection of the Northwestern station on the West Side has already resulted in machinery manufacturers and dealers seeking locations elsewhere. The dealers will endeavor to maintain Machinery Row unbroken in the immediate vicinity of their present location, although several of the manufacturers have already secured sites outside of the city where land is cheaper and where extension can be made with only comparatively small expenditures for property.

Illinois Central Railroad's Machinery Requirements.

The Illinois Central Railroad has out a list of equipment for its shops at Harahan, La., which are in course of erection to replace the shops destroyed by fire a few months ago. The list includes 25 machines and 30 metal lockers and is as follows: One 12-in. four-side moulder; one 24-in. combination hand and power feed surfacer; one swing cut-off saw, 24-in. and 10-ft. table; one 42-in. drill press, socket ½ to 2 in.; one Warner & Swasey No. 3 universal turret lathe, 18-in swing, geared friction head chasing attachment, automatic chuck; one Greenlee No. 3 heavy car gainer; two horizontal water tube boilers in one battery, 300 hp. each, 160 lbs. working pressure; one sensitive frictional drill press; one twist drill grinder; five machinist's vises, Lewis patent No. 9, with stationary base and adjustable jaw; one 42-in. vertical boring and turning mill, with two heads, quick change gear, positive feeds, table with chuck face plate complete; one engine lathe, 16-in. swing, 6-ft. bed, taper attachment, 12-in. combination independent and universal chuck, quick change gears; one Pond planer, 30 x 30-in. x 8-ft., one head with quick return; one 26-in. crank shaper, with back gear and quick return; one wet tool grinder, 24 x 2-in emery wheel complete; one duplex, two-stage, rolling mill frame Meyer gear air compressor, displacement 630 cu. ft. per min. at 120 rev. per min.; one duplex 14 x 10¼ x 10-in stroke, washout pump, brass lined water cylinder; one duplex 5¼ x 3½ x 5 in. stroke Deane pump, boiler feed, brass lined water cylinder; one 28-in. portable rotary valve seat planer; one Buffalo No. 2-B column blower and countershaft.

The Chicago, Burlington & Quincy Railroad has submitted lists to the trade covering about 75 tools. A various assortment of tools is included and the equipment is intended for different shops on the line.

Plans are fast developing on the extensive improvements to be undertaken by the Grand Trunk Railroad system at Battle Creek, Mich. Approximately $2,000,000 is to be expended at this place in the erection of new buildings and the purchase of equipment. Esitmates are now being made on one of the first buildings, a large machine shop of 25 engines capacity. Machinery lists will probably not be issued for several months, but will include a large number of tools.

The Rock Island system is preparing plans for extensive shop additions on the Chicago & Eastern Illinois Railroad division at Danville, Ill. It has not yet been decided whether the work, including the purchasing of machinery, will be done by contract or whether the road will undertake to erect the buildings and place the equipment through its purchasing department.

At least five concerns located within the area to be taken by the Chicago & Northwestern Railroad for its terminal have now secured locations elsewhere. Other deals are pending with real estate men and property owners and will be consummated shortly.

The Marshall & Huschart Machinery Company, Chicago, has purchased property on South Jefferson street as a future location for its business. The property is on the east side of the street, about 100 ft. from Madison street. It will be improved with a modern manufacturing building which will have ground dimensions 80 x 135 ft. and will be several stories in height. The property is at present occup.ed by structures of little value and these will be razed as soon as the company is ready to go ahead with the erection of the building. The main floor and such additional space as is needed, will be occupied by the company itself, the remaining space being leased to desirable tenants, many of whom will probably be then included in the exodus from the district which has been acquired by the Chicago & Northwestern Railroad for its new station. It has not yet been decided when the erection of the new building will be commenced. The Marshall & Huschart Company is on the opposite side of the street from the property acquired by the Chicago & Northwestern Railroad, but it is probably only a question of time before this property will have been purchased by railroads entering the Union Station, who will use it in extending their terminals. The Pennsylvania and Chicago, Milwaukee & St. Paul railroads have long been cramped by lack of sufficient trackage and now that the Northwestern has established a precedent in providing for adequate terminal facilities, the two former roads named are expected to take similar steps. The Pennsylvania Railroad is mentioned as one of the most likely seekers after this property, though the St. Paul is not likely to remain idle long since the Northwestern has announced its plans.

The Consolidated Press & Tool Company, builder of presses, dies and sheet metal tools and automatic can making machinery, 96-100 North Clinton street, Chicago, has arranged to move to Hastings, Mich., where a large modern machine shop will be erected, giving at the start about three times the capacity of the present Chicago shop. In addition to the machine shop, a foundry and forge shop will also be erected, enabling the company to take better care of the trade than has been possible in the past. The demand for the new line of power presses and special sheet metal working machinery has increased so rapidly during the past two years that enlarged quarters have become absolutely necessary. The new shop will be made modern in every way, equipped with electric traveling cranes, arranged so that heavy castings will be transferred from the foundry direct to the machine shop without handling except by crane. Electric power will be used throughout the shop, the power being generated from a modern turbine water wheel. A shop will be retained in Chicago for local trade and for the making of dies and miscellaneous small jobs, but removal from the present location will be necessary as this comes within the zone of the Chicago & Northwestern terminal operations.

The William Ganschow Company, manufacturer of gears, Chicago, has purchased the old residence and ground at the southwest corner of Washington boulevard and Morgan street for $31,000. The land fronts 125 feet on each street. The company was for 25 years at the northeast corner of Canal and Washington streets and three years ago erected a new five-story building at 12 and 14 South Clinton street, which it has just sold to the Chicago & Northwestern Railroad. It holds a lease from the road, however, and may take no immediate steps toward moving. It is the intention to construct a modern four or five-story building on the land just purchased.

The Gould Company, manufacturer of pumps and well supplies, 22 and 24 North Canal street, Chicago, has leased from the Newberry library a six-story building to be erected by the latter at the southeast corner of Ohio and Franklin streets. It will have ground floor dimensions 88 x 110 ft. and is to be ready for occupancy by February 15. The company now occupies a five-story building which is in the district to be occupied by the new Northwestern passenger station.

The Brown & Sharpe Mfg. Company, Providence, R. I., whose Chicago store is at 16 and 18 Clinton street, Chicago, another company which is compelled to move out of the machinery district, has purchased for $60,000 the vacant property at the northeast corner of Desplaines and Washington streets and will erect a building thereon for its occupancy. The property fronts 75 ft. on Desplaines street, with a depth of 150 feet on Washington street.

Johnson & Carlson, manufacturers of tanks, now at 258 North Halsted street, Chicago, have purchased 80,000 square feet fronting 269 feet on Blackhawk street, 350 feet on Smith street, 174 on Eastman and 400 on Hawthorne street for $45,000 and will erect thereon a manufacturing plant for their use.

A new plant for the manufacture of automatic saw sharpeners, stretchers, scarfing machines, fitting-up and brazing clamps, shears, hammers, anvils, etc., will be built at Benton Harbor, Mich., by the Covel Mfg. Company, Chicago, which now operates a plant at 8 and 10 South Canal street. The machine shop will be two stories in height, 50 x 250 ft. and the foundry, 75 x 175 ft. All of the machine tools, which have already been purchased, will be driven by individual motors. Upon the completion of the new plant May 1 the Chicago office of the company will be maintained at 1217-1218 Fisher Building.

The B. F. Barnes Company, Rockford, Ill., manufacturer of drill presses and lathes, is building an extension to its machine shop 71 x 112 ft., and a new foundry is being added 96 ft. long with a width at one end of 160 ft. and at the other of 100 ft. A part of this building is two stories high, the second floor being used for the storage of patterns, flasks, etc. The company reports the demand for machinery unusually heavy and on certain sizes of drills is three months behind on shipment. The cupola which will be installed in the foundry will have a melting capacity of seven to nine tons per hour.

The Gerson-Carey Company, Lansing, Mich., will shortly be in the market for one or two drill presses. The company has just moved into its new plant, located on Kalamazoo street east and the Lake Shore tracks, which is about four times the size of the old one. Its equipment was purchased from the Warner & Swasey Company.

The Western Foundry Supply Company, East St. Louis, Ill., whose alloy grinding plant and foundry facing mill was destroyed by fire some time ago, has plans prepared for the erection of a new building in which the two departments will be located. It will be of fireproof construction throughout, 50 x 148 ft. and two stories high, with sections on either end three stories high. The power plant will be located in the center of the building and will separate the facing and alloy grinding departments, fire walls being used to protect the engine room. The company is now in the market for a coal crusher, two Buhr mills, a 75

hp. engine, pump, shafting, hangers, &c. Although temporarily inconvenienced the company is now filling all its orders with dispatch, notwithstanding the difficulties that have been experienced. A temporary office has been established in the First National Bank Building of East St. Louis, and it is probable that this will be maintained after the new plant has been completed.

Charles H. Besly & Co., Chicago, report an excellent business for the month of October, receiving many large orders for spiral circles, disk grinders and band polishing machines from New York, Massachusetts, New Jersey, Michigan, Ohio, Austria and Sweden. The company also states that it has a large stock of brass and copper in the various sizes which it usually carries.

D. W. Mead, consulting engineer, Chicago, is preparing plans for a hydro-electric plant on the Des Plaines River below Channahon, Ill., for the Channahon Power Company, Chicago. Although plans have not been fully completed, it is probable that a one-story building costing about $100,000 will be erected.

Plans for a service building for the Auditorium Hotel, Chicago, to be built on Congress street between Wabash and Michigan avenues have been completed. It will be two-story, 70 x 145 ft., and will contain four boilers aggregating 1640 horse power, pumps and other equipment.

An addition is being made to the Quaker Oats plant at Battle Creek, Mich., consisting of three buildings, one five-story, 55 x 75 ft.; one of mill construction, five-story, 45 x 75 ft., and a boiler house, two-story, 40 x 80 ft. Considerable equipment for the power plant is required.

Philadelphia Machinery Market.

PHILADELPHIA, PA., November 13, 1906.

There was considerable buying in a quiet way the past week. While the volume of business transacted was not especially large there was enough done to satisfy the trade on the whole, and particularly so when the season of the year is taken into consideration, as not infrequently buying begins to fall off early in November and gradually decreases until after the turn of the year. The greater part of the business thus closed was in single tools, but covering a wide range. The tendency of buyers to pick up single tools and small lots from a number of merchants and manufacturers continues, as by so doing it appears to be possible for them to obtain better deliveries than when the business is placed in large blocks. In fact, the local market appears to be bare of large propositions at this time.

There has been a better demand for the heavier special tools, and some fairly good business has been closed in those lines. Not only has this been the case recently in this class of tools alone, but the standard machine tools of greater weight and more strength and stability seem to be in more demand.

Inquiries continue to be received in good number, although probably not as large as some weeks ago. The scattering of inquiries on the part of prospective buyers in order to obtain the best deliveries obtainable makes the demand appear greater than it actually is. The railroads are making but few inquiries. Some scattered orders have been taken from those sources by local concerns, but the amount is small.

Manufacturers of all classes of tools are fully occupied and will in most cases welcome a cessation of orders for a time. Deliveries become worse and worse, and a large amount of business offered is lost to the manufacturers by their inability to meet delivery requirements. Every effort is apparently being made to get tools out as fast as possible, but orders have come in too rapidly to make any material gains on shipping dates, while more and more difficulty is being experienced by tool builders in obtaining raw materials with any degree of promptness.

The foreign demand is unchanged. Some inquiry for standard tools is heard of, but manufacturers give this branch of the trade but little consideration in view of the delayed deliveries on domestic business. Some few orders for special tools have been booked, while the business in the various specialties which have had a more or less established trade abroad continues quite good.

The demand for second-hand machine tools is active and no trouble is experienced in selling such tools of good make which are in a fairly good condition. Dealers have difficulty in supplying the demand in some lines and sizes, as good tools are not plentiful.

Manufacturers and dealers in boilers and engines report improved conditions. There are several propositions for equipment of the higher powers under consideration, but business closes up slowly. The demand for medium and lower power installations is more active, and a fair volume of business is being done in this field.

The foundry trades are extremely active. The demand continues good for castings of all classes and complaints of delayed deliveries are frequently heard from machine tool builders. The steel casting plants are the most active, while a number of the gray iron plants have had more tonnage offered than they could conveniently take care of.

The Bureau of Filtration, Department of Public Works, city of Philadelphia, is asking for sealed proposals for boiler equipment for the No. 2 boiler house at the Lardner's Point Pumping Station under contract No. 92. This includes six 500-hp. water tube boilers, mechanical stokers, ash and coal handling equipment, &c. Specifications and drawings may be had from J. R. Hathaway, director, Room 712, City Hall, and bids will be received until noon November 30. The same department will also receive bids for replacing defective boiler tubes in 12 marine type boilers at the Frankford Pumping Station. Proposals for this work will be received until November 22.

The Espen-Lucas Machine Works notes a good demand for its full line of tools. Cold saw cutting off machines for steel foundry, forge shop and general purposes have been in particularly good demand, and the tendency toward those of the heavier types is more pronounced. All departments of the plant are busy, and a large number of orders have recently been placed on the books. Shipments have been quite heavy, and include steel foundry and bar and beam cold saws for various concerns in the East and West. Several large floor boring machines were also shipped to customers in the Eastern States and the Middle West.

I. H. Johnson, Jr., & Co., Incorporated, have recently shipped a number of large lathes with heavy and long beds, one of 60-in. swing going to the Pacific Coast, while several 48 and 36 in. lathes were delivered to customers in the Pittsburgh District, and a varied line was shipped to various New England concerns. Business with this company is in very good shape, a large number of orders are on the books and every department is fully occupied. In some sizes of lathes deliveries are much delayed, while on others fairly prompt shipment can be made.

The High Duty Saw & Tool Company, Eddystone, Pa., is running its plant double turn, to meet the demand for Tindel high duty saw blades and its Paragon type of cold saw cutting off machines. Duplicate orders for saw blades, ranging from 12 to 72 in. in diameter, are being received in quantity, while orders for cold sawing machines are being taken from various railroad and other shops. Recent deliveries of Paragon cold saw cutting off machines have been made by this company to the R. K. Le Blond Machine Tool Company, Cincinnati, Ohio; the Niles-Bement-Pond Company, and the Industrial Works, Bay City, Mich.

The Tindel-Morris Company, Eddystone, Pa., has sold a number of Tindel-Albrecht crankshaft machines for domestic account to both railroad and automobile concerns, while its European agents, De Fries & Cie, who manufacture these lathes at Duseldorf, Germany, for the European trade, report a good demand, 12 lathes of various sizes now being in course of construction by them for different customers. In the forging department the Tindel-Morris Company has never been so busy. The demand for crankshafts, both finished and in the rough, has been heavy, and facilities have been added to this department to better handle the increasing business in this line.

The Lehigh Coal & Navigation Company will, it is understood, erect a large coal pocket of reinforced concrete at Richmond and Dyatt streets, along the Delaware River, the general dimensions of which will be 37 x 130 ft.

Cincinnati Machinery Market.

CINCINNATI, OHIO, November 13, 1906.

New orders for machine tools continue to come forward with great regularity and each succeeding week averages well with its predecessor. There appears to be a settled disposition on the part of a large number of manufacturers to obtain increased floor space in which to place additional machinery in order to facilitate handling the output of the plants. Several of the smaller shops report sufficient business ahead to occupy their time for an entire year, with the larger builders booked for six or eight months in the future. The labor situation is quiet and generally regarded as satisfactory and outside of the daily routine of an enormous business there is little of interest.

It is reported that Marshall Halstead has been looking over the available buildings of the city with a view to establishing a large steel stamping mill, partly backed by local capital. Several sites have been recommended, but the location is as yet undetermined.

Secretary Finch of the Industrial Bureau advises that the annual excursion will be held on the 27th inst., a special train over the Cincinnati, Lebanon & Northern taking the members to the numerous large manufacturing plants at Norwood and vicinity. The list of members of the bureau includes most of the machine tool builders of the city, and these excursions have been of great good in the interchange

of ideas, at the same time developing new territory for manufacturing purposes.

The Precision Machine Tool & Development Company has been incorporated with $10,000 stock by F. A. Wagner, H. L. Linch, E. A. Wagner, A. Fanador and F. L. Fanador. It is understood that this enterprise is backed by A. Fanador, the South American representative of the Blymyer Iron Works, and also by local capital. A plant will be established some place in the west end of the city for the purpose of manufacturing ice machinery, sugar refining appliances and other machinery of like nature and introducing them in Central and South America. In addition to this the company will erect bridges and, in fact, be in a position to secure a portion of the trade that will be developed during the progress of the Panama Canal.

The Citizens Motor Car Company has been incorporated with $100,000 capital stock by Briggs S. Cunningham, H. E. Brenneman, J. M. Richardson, J. E. Thoms and Robert Ramsey.

The Standard Pulley Company, Cincinnati, has increased its capital from $10,000 to $25,000.

The Queen City Punch & Shear Company, recently organized, has absorbed the C. F. Heinss Machine Works of New Richmond, Ohio, and removed the machinery, tools and patterns of the latter plant to the new quarters in this city. Punching and shearing machinery and bending rolls will be the product.

A building permit has been issued to the Stewart Iron Works Company, Covington, for the erection of an additional building, 100 x 160 ft, necessitated by the demand for iron fencing, an evidence of which is shown in the fact that during the week the company was awarded the contract for supplying the Columbus, Ohio, Insane Asylum with 12,500 ft. of 6-ft. fencing. One hundred men additional will be given employment when the new structure is completed, which it is hoped will be about February 1.

New England Machinery Market.

WORCESTER, MASS., November 13, 1906.

The feature of the week in Boston was the arrival of the list of machine tools for the Lynn works of the General Electric Company. The dealers are busily at work preparing their bids, which is no small task where close to $250,000 is involved. The list is one of the largest that New England has seen for several years, equaling that of the New York, New Haven & Hartford Railroad for its new locomotive repair shops at Readville, Mass. Nothing approaching its magnitude is expected again until the Boston & Maine Railroad is ready to equip its great repair shops, which will probably be erected next season at Somerville, in the suburbs of Boston.

A week ago the manufacturers of machine tools were rather congratulating themselves that the condition of deliveries had caused a letting up of business. The present week has proved it a mere transient lull, probably caused by the elections. Now the manufacturers are finding business simply piling in. Each day's mail brings thousands of dollars' worth of business. If the present state of things continues deliveries will be worse than ever. The dealers find the same condition to exist in their more local field, and are now ready to acknowledge that the recent advances in prices have not affected them in the least in scaring away business. They assert, as the manufacturers have all along stated, that no customer thinks of speaking of price, so anxious is he to secure delivery.

It is interesting to note the types of machine tools that have been unearthed during the past six months, in the effort to get more machinery with which to meet the demand for manufactured goods. Some of the tools occasionally seen on the floors of machinery salesrooms border on the archaic, yet it not infrequently happens that they still possess elements of real usefulness. Standard tools bearing names of makers now entirely forgotten are constantly appearing, and inquiries as to their origin are frequent, customers wishing to get in touch with their builders. In most such cases the tools, usually engine lathes, were built in small shops which had but a transient existence, the kind of establishment which makes its appearance in times such as these, founded by good mechanics who hope to get a start in business for themselves, a hope which has been realized in the past in a few instances, as great shops of today bear witness.

President E. M. Woodward and Secretary P. E. Montanus of the National Machine Tool Builders' Association have taken time by the forelock and made rather definite preparations for the spring meeting of the association, which will be held in connection with the Jamestown Exposition. The exact date is not determined, though it will be early in May. But it is decided that the association will meet at Old Point Comfort, across the river from the exposition grounds, and distant only a few minutes' ride by ferry. The meeting will be held in the Chamberlain Hotel, where the members will be able to secure comfortable quarters. The other alternative was a temporary hotel, which will be built at the exposition, and it was decided that there is greater surety of attractive quarters at the Chamberlain.

General Electric Company's Machinery List.

The General Electric Company has just sent to the trade a list of machine tools that will be required for the equipment of the new shops now under construction at its works at Lynn, Mass. The list is a heavy one, aggregating upward of $250,000. It comprises: Lathes: eleven 12 in., fifty 16 in., two 18 in., four 20 in., ten 24 in., two 32 in., two 22 in., for heavy roughing; Speed lathes: three 10 in.; Planers: two 26 x 26 in. x 10 ft., four 30 x 30 in. x 9 ft., one 30 x 30 in. x 12 ft., five 36 x 36 in. x 9 ft., one 48 x 48 in. x 12 ft., two 24 x 24 in. x 6 ft.; Shapers: one 16 in., three 12 in., one 20 in.; Upright drills: three 20 in., one 22 in., three 24 in., four 26 in., four 28 in., three 30 in., five 32 in., two 36 in., four 32 in. mounted on one base; Milling machines: one single head Pratt & Whitney, double column, or its equivalent; three plain mills, No. 1 Pratt & Whitney, or equivalent; one plain mill, No. 3 Cincinnati, or equivalent; six No. 4½ Becker-Brainard, back geared, or its equivalent; one No. 2 Pratt & Whitney, or its equivalent; one No. 3 Garvin hand miller, or its equivalent. Vertical milling machines: Two No. 5, one No. 6. Radial drills: six 6 ft., one 9 ft., one 4 ft. Sensitive and manufacturers' drills: one two-spindle, 13 in.; one four-spindle, sensitive; three two-spindle, sensitive; one one-spindle, sensitive; one six-spindle manufacturers'. Vertical boring mills: thirteen 42 in., four 72 in., two 12 in., one 14 to 20 in., all two heads. Horizontal boring mills: one Betts No. 2, or equivalent. Slotters: one 11 in., one 68 in. Turret chucking machines: one 22 in., cross feed; three 32 in., cross feed; four 3 x 36 in.; one ⅝ x 4½ in., Jones & Lamson, or equivalent; one 1 x 10 in.; two full automatics; two 3 x 6 in. Turret lathes: one 18 in., one 24 in. Five 18 x 2 in. water tool grinders, one 4¼ in. centering machine, one reaming machine, one cutting off machine, two No. 4 arbor presses, three universal tool grinders, one 30-in. key seater and five tapping machines.

The New England Butt Company, Providence, R. I., manufacturer of wire rope and other machinery, is to build an addition to its No. 3 building, making it three stories instead of two. The building is 40 x 153 ft.

The Industrial & Mfg. Company, New Britain, Conn., is erecting a plant for manufacturing purposes at Danielson, Conn. L. J. Coburn, the manager of the company, states that two 100-hp. horizontal tubular boilers and a 125 or 150 hp. engine will be purchased.

The Heald Machine Company, Worcester, Mass., manufacturer of grinders and grinding machinery, is erecting a new boiler house in which will be installed an 80-hp. boiler, room being provided for a duplicate of the unit when the need shall demand it. The company plans to build an extension to its shop in the spring, doubling it, and when this is done a new engine room will be built, connecting with the boiler house, and a generator will be installed and the shop equipped for electric drive throughout. A smaller generator will be installed immediately to increase the lighting capacity. The boiler house is situated so that coal can be dumped from cars to a bin in front of the boiler, and an industrial railway will provide for the removal of ashes.

The Hart Mfg. Company, Hartford, Conn., manufacturer of electric specialties, has purchased a tract of land, 200 x 600 ft., on Hamilton street, with the ultimate purpose of erecting a plant on the premises. No plans have been made, but as the company's works on Allyn street are crowded it is supposed that a factory will be erected in the not distant future.

The W. S. Littlefield Mfg. Company, 134 Eliot street, Boston, manufacturer of light machinery, experimental work and novelties, has been incorporated in Massachusetts with capital stock of $10,000, the incorporators being Willie S. Littlefield, Albert E. Rogers and Harold R. Small. The company is looking for a new location, and when it has moved its shop will be in the market for machine tools.

The La Pointe Machine Tool Company has removed its business from 32 Atlantic avenue, Boston, to Hudson, Mass., where a new shop has been erected.

The Barnard-Briggs Mfg. Company, 27 State street, Boston, which has leased a factory building at Woodville, Mass., for the manufacture of automobiles, has made plans for an addition to the building, 40 x 100 ft., and one story. The company has purchased some of its machine tool equipment, it states, and will be in the market for more machinery later.

Well drillers desiring to calculate the rate of flow of an artesian well lower a bottle of aniline fluid to a depth of, say, 500 ft., and then electrically explode a cap to burst the bottle. The time required for the fluid to appear at the surface gives an accurate gage as to the velocity of flow. It is claimed that this method gives results as accurate as a weir. The diameter of the pipe being known, the rate of flow readily follows.

The National Founders' Association.

Opening of the Tenth Annual Convention in New York.

The first session of the tenth annual convention of the National Founders' Association was called to order at 11 o'clock Wednesday morning, November 14, at the Hotel Astor, New York City, by the president, O. P. Briggs, of Minneapolis. Nearly 200 members were in attendance. The preliminary interchange of experiences in the hotel lobbies and the registration room developed the reason for the large turnout and the keen interest in the questions to come before the meeting. The past six months have been marked by the most serious strikes the foundry industry has known in years, and the National Founders' Association has been perforce a fighting machine. That ground had been gained and that labor conditions would never be the same as before the strike of last May, was the consensus of the comment of members.

The annual meeting of the Administrative Council of the association was held at the Hotel Astor on Monday and Tuesday, and consideration was given to questions growing out of the recent strikes, as well as to the subjects to be presented to the convention for discussion.

What is known as the "alumni" banquet was held on Tuesday evening. Those eligible to attend are present and past members of the Administrative Council and all past general officers of the association. The function of this year was a notable one, covers being laid for 42 persons. Antonio C. Pessano, president of the Great Lakes Engineering Works, Detroit, was toastmaster, and the informal speechmaking was participated in by O. P. Briggs; I. W. Frank, Pittsburgh; C. Bermingham, Kingston, Ont.; Stanley G. Flagg, Jr., Philadelphia; R. C. Oliphant, Trenton, N. J.; O. P. Letchworth, Buffalo; John A. Penton and J. H. Webster, Cleveland.

Committees.

At the opening of the convention President Briggs announced the appointment of the following committees:

Committee on Resolutions:—F. B. Farnsworth, McLagon Foundry Company, New Haven, Conn.; W. H. Winslow, Winslow Brothers Company, Chicago; O. P. Letchworth, Pratt & Letchworth Company, Buffalo.

Press Committee:—H. N. Covell, Lidgerwood Mfg. Company, Brooklyn, N. Y.; C. Bermingham, Canadian Locomotive Company, Kingston, Ont.; W. M. Taylor, Chandler & Taylor Company, Indianapolis.

Finance and Auditing Committee:—Geo. E. Emmons, General Electric Company, Schenectady, N. Y.; James McNaughton, American Locomotive Company, Schenectady, N. Y.; Geo. W. Watts, Canadian Foundry Company, Toronto, Ont.

Reports of Officers.

The report of President Briggs was the first order of business. It reviewed at length the conditions under which the association had conducted its work in the past year, and defined the issue of the closed shop and union regulations as raised by the molders' demands. Had the issues been merely hours and wages, the president said, their adjustment would have been speedy. The president's report, as were those of the commissioner and secretary, was received with hearty expressions of approval.

Commissioner W. L. Herendeen reviewed the work of the association in combatting the May strikes of 1906, and indicated the successful outcome of the effort to organize new forces in the struck shops. More than 2000 molding machines have been introduced since then.

The secretary, F. W. Hutchings, in a creditable report summarized the work of the association's central offices in the past year. The strikes in progress a year ago involved 43 shops of members employing 1759 molders and coremakers. On May 1 strikes were called in 34 plants employing 1740 men. Later in May strikes were started in 15 shops employing 600 molders and coremakers, a total of 92 plants and 4099 employees. The membership of the association a year ago was 456 firms, operating 500 plants; to-day it is 475 firms, operating 531 plants.

At the afternoon session reports were presented from the various cities in which strikes are on.

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HARDWARE

IT has been found in several lines of business that practical demonstrations of salesmanship, "keeping school," as it were, with the salesmen, and especially the new and inexperienced salesmen, as the pupils, work out into important practical results. The great life insurance companies have employed the system to their great advantage, and wholesale houses frequently use it with their corps of travelers and are very well satisfied with what it has accomplished. Doubtless an occasional Hardware merchant in the retail field has found it to his advantage to "keep school" with his young men in much the same manner. It pays to give personal attention to the weaknesses of employees, and a most efficient way to do it is by practical lessons in methods of selling goods, making the clerk act as salesman with his employer or other experienced man as purchaser, and as customer with his teacher as the salesman.

The method of the life insurance companies is to have its agents solicit business of an experienced man, who knows all the ways of those who are sought for insurance, and he acts as the teacher. The solicitor's advances are met with the usual answers of the man who ought to take insurance but will not, who does not care to bother with it, or is unwilling to accept it as a business proposition. The agent is next made to take the place of the man to be insured and the teacher solicits him with all the skill of experience and natural capacity. The system produces good men, because it teaches them in a practical way what would otherwise require long experience. The same general system has been adopted by some of the large houses that send out salesmen. The new man, or the man whose work is not up to standard, is required to solicit business and perhaps sell a bill of goods to his teacher, a man of long and successful experience, and in turn takes the place of the customer while his teacher sells him the goods. Instances are told of salesmen making sudden jumps from unsuccessful to first rate men because they have been taught how to do the work.

It is not difficult to see where this simple system of instruction can be applied to the Hardware store. Every one who has occasion to visit retail establishments of all classes knows the annoyance of dealing with a clerk who does not know his business, and there are many such in all lines of trade. Inexperience sticks out all over him. He may cause a customer to go on to some other store, or if he is acquainted in the place he may wait for some other clerk or a member of the house. There is always the danger that even an old customer may become disgusted and go where he can be waited upon quickly and intelligently. The average customer of the Hardware store needs more or less assistance in his buying. He frequently does not know just what he wants, or he may think that he does when in reality he would be better served in his requirements with something else. A tactful, ready suggestion may be valuable to both customer and merchant. The lack of intelligent assistance may mean an actual loss of business. The merchant is more or less at the mercy of his employees. Their skill is everything to him. Usually the fault is not so much with lack of brains in a clerk, but in his ignorance. He has been left to pick up his experience, assisted only when blunders or failures come directly under the observation of his superiors.

There are obviously many methods which may be adopted for thus imparting instruction to the salesmen. Among those which have been suggested is that the proprietor or one of the head men on the floor should drop into the store and in all seriousness proceed to make purchases from a new clerk. The latter's weaknesses would soon make themselves apparent, the lesson being followed up by sending the clerk out and having him call and make some purchases, the man who has been playing as the customer now acting as the salesman. The new man will see the difference and will learn lots of things. This repeated occasionally may be expected to bring forth results in developing a salesman more quickly than would ordinarily be the case. The training, too, will be according to the methods of the employer and the traditions of the store will be implanted. The manner of selling goods, thus exemplified, will become the standard of the house. After such a lesson the clerk should be encouraged to ask questions, that he may learn why such a thing was said or done. Actual contact with genuine customers is, of course, also necessary. The purpose of "keeping school" is to bridge over the period of ignorance when the new clerk is likely to do more harm than good with customers and make the period as short as possible; to establish firmly the customs and methods of the house, and to eliminate from the premises the new man if he prove to be lacking in the qualities that are essential to successful salesmanship.

It is, however, for each merchant to solve the problem in his own way. What is essential is to impress on the force, be it large or small, the importance of salesmanship and the necessity of endeavoring at least to be a good salesman, to this end getting close to the employee and giving him full advantage of a knowledge obtained from long experience. Wideawake young men are quick to see and adapt themselves to better ideas of salesmanship, and would welcome measures intended to aid them in becoming proficient. Those who have tried this method of instruction report that it yields excellent returns for the trouble entailed, and sometimes works wonders in the education of a young man bright enough and earnest enough to be worth the keeping.

Condition of Trade.

With the continued influx of new orders and with many back orders still on their books manufacturers find no let up in the pressure on their producing facilities. The scarcity of goods in many staple lines is pronounced, and retail merchants in increasing numbers are obliged to put off customers whose wants they are unable to supply from their broken assortments. Hence urgent appeals are made to jobbers and manufacturers to hurry up shipments. All this adds not a little to the wear and tear of business, especially as not all are able to take this condition of things philosophically as a slight setoff to the advantages of the prosperity which causes it. Prices continue to advance. The most notable during the week under review are noted in the following columns. Among them will be observed the higher prices announced for Wire Nails and Wire, Strap and T Hinges and Wrought Butts. The market in fact has a decidedly upward tendency and the withdrawal of extra dis-

counts and the making known of higher prices on leading goods is the order of the day. A great many specialties and goods upon the price of which the cost of the raw material has not an immediate and important influence remain unchanged and many lines of this character are in sufficient supply, the most pronounced scarcity being in the great staples. Collections are not altogether easy and it may be that a little difficulty in this department is not without its advantages, tending as it may to slacken a pace which threatens to become too rapid.

Chicago.

That local jobbers and distributers not alone enjoyed a record volume of trade in October is indicated by reports received from the jobbing trade in the Northwest and Southwest, and the indications are that last month's record will remain the high point for the year. A seasonable falling-off in demand is now being experienced, although there is every indication that November will show a big excess over the same month a year ago. Notwithstanding the large additions that have been made to distributers' warehouses, not only in this district, but throughout the entire West, their facilities are already taxed, and the continuation of the present activity will necessitate further additions and extensions. The advance of $1 a ton on Wire products is the event of the week in the Hardware trade, and despite the advancing steel values was not anticipated by the trade in general, Wire Nails, Barb and Plain Wire Staples, Bright and Coppered Market Wire, as well as Field Fencing, were included in the horizontal advance. Before the end of the week announcement will be made of the Poultry Netting and Wire Cloth schedule. There has been much speculation regarding the basis that will be established, but it is certain that prices will be sufficient to at least net the manufacturer a normal profit. There has been no improvement in the sheet situation, the mills being unable to make shipment in less than 60 to 90 days. The movement of holiday goods is heavy, and while transportation facilities are not as good as might be desired nevertheless shipments to points west of here are not being unduly delayed.

Cleveland.

THE W. BINGHAM COMPANY.—We have been too busy taking care of the wants of our customers of late to think much about the condition of trade. However, there seems to be but one condition and that is excellent.

At the present price of ingot copper and other metals we may expect to see higher prices on many manufactured goods. Then, too, another reason why higher prices must be obtained is on account of the large quantities of metals that are being consumed, and the supply does not keep up with the demand. It is reported that the demand for raw copper in 1905 was 30 per cent. greater than in 1904, but the increase in the supply was only 10 per cent.; hence the rise in the price of the metal. So you see at once it is not speculation that raises prices, but it is actual consumption that obliterates stocks of copper and makes higher prices on the raw as well as on manufactured goods.

The increase in the supply of copper during the year 1906 over 1905 has been only 9 per cent., while the demand, for many reasons, has increased very largely and is keener now than ever. Just stop and think; less than a year ago the best ingot copper was selling around 18 cents a pound, and to-day it is selling around 23 cents for immediate delivery. It is reported that most of the big producers have their entire output sold for months in advance. Now stop and think what the difference between 18 and 23 cents a pound on copper alone means—viz., just one thing—millions of dollars added to the cost of manufactured goods. One can see at once that the price of copper is not due in the least to speculation, but is the result of increased consumption the world over.

There has also been a large increase in the price of pig iron, pig tin and other metals, and a marked advance in the price of labor, as well as shorter hours, all of which goes to prove that higher prices must be obtained on manufactured goods. The only safe thing to do from the manufacturers' standpoint is to commence anew, with prices based on the present cost of material and labor.

Now, then, if the jobbers who have large stocks of these goods see fit to divide up with their retail customers, and they, the retail customers, see fit to increase their business and favor their customers and are willing to sell their goods at a moderate advance (and the jobber is doing this), there is no reason why a healthy and prosperous trade should not continue for an indefinite time.

A great many of our friends have taken advantage of the advice we gave them—viz., to take into stock at once many goods that have already advanced. You will find, however, that your jobbing friends are well supplied on some goods and are willing to divide up with you without putting on the full rate of profit that they should ask. They feel liberal toward their friends and are willing to help those out who have not already covered themselves, to the best of their ability; sort of what you might call reciprocity.

St. Louis.

NORVELL-SHAPLEIGH HARDWARE COMPANY.—The dem'd prosperity continues. Advances in prices are now the order of the day. We take back what we said a few weeks ago about the conservatism of the manufacturers—it's all off. Lines that are already high are squeezed up just a little higher. Yesterday a prominent railroad supply man told me some of the leading railroad purchasing agents of the country are shaking their heads; he intimated if these advances continued it would check business, as the railroads will quit buying. The railroads cannot advance their rates, they cannot pass "the lemon" to the consumer.

Now that we are back at our desks again after attending the Atlantic City convention and devoting a week to New York, we can philosophize over and draw morals from our observations.

We have had several years of prosperity. The fruit of this prosperity is becoming over-ripe. Might we delicately intimate at Atlantic City in certain quarters there was a wee little sign of self-complacency—we can hardly use as strong a word as "arrogance"?

The writer heard one prominent representative of certain manufacturing interests say in plain language, without joking, without a smile on the lips or a twinkle in the eye, "The jobbers can go to h—." He also admitted 60 per cent of their product is sold by the jobbers.

If manufacturers who control the market on certain lines of goods that are protected by patents, by the tariff and further by selling goods, decide the jobber is entitled, for his services as distributer, to only a maximum profit of 10 per cent., then the gentleman is no doubt correct—if their selling ideas are to prevail the jobber will wind up in Hades.

With order books full; with red flames spouting from the factory chimneys day and night, it would be something beyond human nature if some of us did not "feel our oats" just a little. Some of the advances have been so well taken it is not surprising we should want to add just a little more. Jes' so! Jes' so!

Now we see a jobbing correspondent of *The Iron Age* wants it understood he did not go to Atlantic City to have a good time, but went there to work hard. Some did—some did not. When one goes to a convention and spends the firm's money and comes back all tuckered out from working so hard, such editorials, read by "the boys" at home, do not have exactly the right effect.

"Waste not your Hour, nor in the vain pursuit
Of This and That endeavor and dispute;
Better be jocund with the fruitful Grape
Than sadden after none, or bitter, Fruit."

If old Omar, who is responsible for the above, had been at the convention I am sure he would have been the center of an interested group around one of the tables in the basement of the Marlborough-Blenheim.

It has been remarked several times before that human nature changes very little from age to age. Note what Shakespeare writes:

"For who would bear the whips and scorns of time,
The oppressor's wrong, the proud man's contumely,
The pangs of despised love, the law's delay,
The insolence of office and the spurns
That patient merit of the unworthy takes."

From the above one would imagine even Hamlet had attended a Hardware convention, and had some of his pet resolutions voted down.

Then from Atlantic City to the Waldorf! Here the evidences of prosperity reach their climax. How the elderly matrons do swagger in their silks and satins, in their old laces and diamonds! How sad it is one cannot eat and drink over much without growing stout! How delicately, in revenge, nature always makes the punishment fit the crime! But it is all right. Who knows how many hardships and vicissitudes these dear old girls have suffered in the past! Who knows how many years their souls have yearned for "peacock alley!" They are just bringing up the average. The old man has made his pile and they do not propose the children shall spend it all. The youths and maids raised in an atmosphere of dollar tips will quickly do their part to restore the family wealth to the consumers from whence it came. And as Elbert Hubbard says, "For all such fate is waiting round the corner with a stuffed club."

So everything is all right. Action and reaction is the law under which we live. Those in moderate circumstances do not object to the rich having automobiles, but they do object to being run over by them.

Arrogance and the display of wealth and suddenly acquired riches make for discontent on the part of the masses, and at this swing of the pendulum stands Hearstism.

No, we are not pessimists, we are just dictating before lunch. Solomon wrote his Songs the night before and his Proverbs the morning after.

Philadelphia.

SUPPLEE HARDWARE COMPANY.—The slight holding up of trade for a couple of days during the several State elections was soon overcome by the additional orders received a few days later, showing that there was not much anxiety concerning the continuation of good trade regardless of the results of election. Why should it be otherwise? The Presidential elections are the only ones whose results extend over the entire country and occasionally cause business anxiety to the extent of holding up trade.

Trade continues in good volume regardless of manufacturers' advances, although the many advances which have recently taken place do occasionally upset the buyer, who naturally shows the salesman his bill for the last purchase of the same goods. However, none of us can give good reasons why these advances should have been delayed or avoided. "While the sun shines bright why should one worry about clouds and rain that may follow." What the manufacturers, jobbers and retailers should do is to conduct their trade on good business principles. This is being done by manufacturers as shown in the recent advances, and jobbers should have no fault to find. If the jobbers conduct their business on the same principle then the retailer should have no anxiety as to his safety in keeping his stock in good condition and sufficiently large to retain all the trade within reach.

There is no question about the unusual output of Hardware manufacturers nor the increased trade of a large percentage of both jobbers and retailers, which has surpassed all previous records, and there is every evidence of a continuation of the same for the balance of the year; certainly if weather conditions are as favorable as they have been for the last few weeks—and it looks to us as if all were taking advantage of their opportunities.

The money market continues tight and the demands upon the banks are very great. Indeed bankers say they have never known a time when the demands on them for funds were greater than for the last few months. This extends over the country and is evidently the cause of the comparative slowness in many remittances.

St. Paul.

FARWELL, OZMUN, KIRK & CO.—As winter approaches the features that are expected with the closing of the year are apparent. Orders are smaller, but are large in number and make up a satisfactory volume of business. This, too, in the face of conditions less favorable than hoped for earlier; conditions resulting partly from excessive rains over a large territory and still more from the badly congested condition of the railroads, thus failing to move the crops to market as rapidly as desired. The result is that the crop movement will extend through most of the winter, and merchants cannot realize as large returns from the crops as they would have done if the movement had been more rapid.

Under these conditions collections, while they are fair, are not fully up to expectations, and the outstandings at January 1 are certain to be somewhat larger than expected. This situation will probably be partly met by larger cash receipts than usual after the new year, but the final showing of results in marketing the crop will not be quite as favorable as was expected at harvest.

Prices of grain and other farm commodities are generally not so high as they should be and are not on a level with prices of lumber, labor, &c. This does not apply to dairy products and eggs, but wheat should be 12 to 15 per cent. higher and so should most farm products. It is certainly apparent that our wheat raising farmers are trying to do too much. They should farm less and farm better. They are employing too much high priced and yet inefficient labor; less acreage and better tillage will produce much better results. This will come in time, but the wise farmer will adjust himself to these conditions without waiting.

Upon the whole the situation is favorable and fair business for the first half of next year is now assured in so far as we are ever safe in discounting the future. A strong market price for all lines of Hardware may be expected. Some advances in price are reasonable with the increased cost of material and manufacturing, but such advances should be moderate and in some lines are now high enough. Lumber has been advanced too much. We do not believe this will be true of any line of Hardware. Lofty flights, to be followed by corresponding descents, are to be carefully guarded against and avoided.

Nashville.

GRAY & DUDLEY HARDWARE COMPANY.—The first ten days of November has shown a little better than the usual results obtained at this season of the year. Retailers throughout the country seem to be in good spirits, and enjoying a fine business. As evidence of this they are buying pretty freely and paying up old scores.

The farmers have gathered and are gathering large crops of almost everything, and the prices obtained have been quite satisfactory; most of them are adopting more up-to-date methods of cultivating the land, and are making improvements in almost every direction. We confidently believe that the great improvements adopted by the farmers of the country account in a great measure for the increased output of agricultural products, rather than the fact that seasons are favorable.

All kinds of building, mining and manufacturing are being pushed to the utmost in this section. Almost every business of any magnitude in the way of tonnage is suffering more or less because of the shortage of cars which seems to exist among all the railroads.

The tremendous advance which has taken place in the price of pig iron in the last few months has not affected the Hardware market as much as many anticipated. The Hardware manufacturers seem to be pursuing a very conservative course, although there are many sharp advances, and no doubt a great many other manufacturers will be forced to revise their prices, especially where the raw material enters largely into the manufacture of the articles. Taking it all together conditions are quite satisfactory.

Portland, Oregon.

FAILING, HAINES & MCCALMAN.—Business in this section continues remarkably good. We have no difficulty with our collections, and the state of trade generally is excellent. Our traveling men report conditions that will make unexampled prosperity in the state at large. Building permits in this city for the last month show an increase of about 40 per cent. over those of the same period last year. This, of course, means more business for us. All conditions are favorable for a very prosperous season in the lumber business as prices are high and the demand is large. This prosperity will, of course, be reflected on ourselves. If we were to go through every industry of the State we should hardly find one that was not unusually prosperous and with every prospect of a continuance of the good times.

NOTES ON PRICES.

Wire Nails.—On Saturday of last week an announcement of an advance of 5 cents per keg in the price of Wire Nails and Staples, and $1 per ton in the price of Barb and Smooth Fence Wire, was made by the American Steel & Wire Company. General conditions have justified higher prices for some time, these including the high price of Steel and heavy demand. The mills are making large shipments, but the output is limited to some extent by shortage in Steel and shipments are retarded by inadequate car facilities. Stocks in Western jobbers' hands are reported as being generally low. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers	$1.90
Carload lots, to retail merchants	1.95

New York.—Stocks of Wire Nails in the hands of local jobbers are well assorted, so that the present good demand can be readily supplied. At the advance of 5 cents per keg the price on small lots at store would be on the basis of $2.10 per keg. Until stocks bought at lower prices are exhausted this price is likely to be more or less nominal, as it will probably be shaded.

Chicago.—Effective Saturday, November 10, Wire Nails and Wire products generally were advanced $1 a ton. The shortage of steel is reflected in this upward movement, although the demand, notwithstanding the season, is unparalleled in the history of the Wire trade. Western consumption is almost insatiate, especially from the Pacific Coast. Stocks in jobbers' hands are generally low, although it is probable that they will increase somewhat at the end of the month, as a falling off in the demand is anticipated in the near future. Official quotations, which are being firmly maintained, are as follows: $2.05 in car lots to jobbers and $2.10 in car lots to retailers, with an advance of 5 cents for less than car lots from mills.

Pittsburgh.—An advance of 5 cents per keg has been made in prices of Wire Nails, or from $1.85 to $1.90 in carloads to the larger trade. The advance was generally expected and is due to the heavy demand for Wire Nails and the scarcity and high prices of Steel. Shipments of Wire Nails by the mills are heavy, but are retarded to some extent by the scarcity of cars, while output is still restricted on account of the shortage in supply of Steel. The new official prices, effective from November 9, are as follows: Wire Nails, $1.90 in carloads to the large jobbing trade, and $1.95 in carloads to retail merchants, f.o.b. Pittsburgh, plus actual freight to point of delivery, terms 60 days, less 2 per cent. off for cash in 10 days. The above prices are now absolute minimum of the market.

Cut Nails.—According to the agreement made at the recent meeting of the Cut Nail Association Cut Nails were to take the same advance that might be made in the price of Wire Nails, previous to the next meeting. This agreement only affected the product of the mills in the association. To what extent the advance will be made by mills not in the association is not known. Mills are still behind in shipments, while Finishing and large size Penny Nails, for which there is a brisk demand in some sections, are particularly scarce. Shortage of Steel and scarcity of cars is interfering with shipments. Some mills are refusing to accept large orders for prompt shipment, owing to their inability to fill them. Official notification has been received from the secretary of the Cut Nail Association of a 5-cent advance in the price of Cut Nails. Revised quotations are as follows, f.o.b. Pittsburgh: Carload lots, to jobbers, $1.95; less than carloads, to jobbers, $2; less than carloads, to retailers, $2.10. Iron Cut Nails at points west of Buffalo and Pittsburgh are held at 10 cents advance on Steel Cut Nails.

New York.—Popular sizes of Cut Nails continue scarce and hard to obtain in the local market. Manufacturers are behind with orders and local jobbers are receiving shipments very slowly. Quotations remain practically unchanged on the basis of $2.05 to $2.10 per keg, according to seller, above which a premium of 5 cents per keg is sometimes asked for popular sizes.

Chicago.—The market is very firm as a result of the surplus of orders and the difficulties which are encountered in getting shipments, particularly on the larger sizes of Steel Cut Nails, of which there seems to be none to be had. Local distributers are fairly well supplied on the smaller sizes and have therefore not had much trouble in supplying the demand on these Nails. A continued shortage of steel and cars is keenly felt in making deliveries. An advance of 5 cents is anticipated as a result of the advance on Wire Nails November 10. Quotations prevail as follows: Steel Cut Nails, in car lots, $2.05 to $2.10; less than car lots, $2.15; Iron Cut Nails, $2.15 to $2.20, in car lots; less than car lots, $2.25.

Pittsburgh.—Following the recent advance of 5 cents per keg in Wire Nails it is believed that the Cut Nail Association will make a similar or larger advance in prices of Cut Nails. The demand for Cut Nails is reported active and the shortage in steel is lessening output, while the scarcity of cars is interfering with shipments. All the Cut Nail mills are considerably behind in shipments and premiums of 10 to 15 cents continue to be paid for reasonably prompt deliveries. The two Cut Nail mills in the Wheeling District are understood to be quoting Cut Nails at $2.05 at mill. Official prices, on which, however, premiums of 10 to 15 cents per keg are being paid for prompt deliveries, are as follows, f.o.b. Pittsburgh: Carload lots, to jobbers, $1.90; less than carloads, to jobbers, $1.95; less than carloads, to retailers, $2.05. Iron Cut Nails at points west of Buffalo and Pittsburgh are held at 5 and 10 cents advance on Steel Cut Nails.

Barb Wire.—An advance of $1 per ton in the price of Barb Wire was made on Saturday of last week. New business with the mills is comparatively light, but specifications on contract orders are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots	$2.05	$2.35
Retailers, carload lots	2.10	2.40
Retailers, less than carload lots	2.20	2.50

Chicago.—While the advance on Wire products generally included Barb Wire, this increase in value does not reflect the conditions of the trade, as the demand at present is seasonably light. Prices, however, are firmly maintained as follows: To jobbers, Chicago, car lots, Painted, $2.20; Galvanized, $2.50; to retailers, car lots, Painted, $2.25; Galvanized, $2.55; retailers, less than car lots, Painted, $2.35; Galvanized, $2.65; Staples, bright, in car lots, $2.15; Galvanized, $2.45; car lots to retailers, 10 cents extra, with an additional 5 cents for less than car lots.

Pittsburgh.—Effective Friday, November 9, prices were advanced $1 a ton. New orders have been light for some time, but the mills still have a good many contracts on their books on which buyers are specifying freely. The new prices effective from November 9 are as follows: Painted Barb Wire, $2.05, and Galvanized, $2.35, in carload lots to the large jobbing trade, with the usual advance of $1 a ton to retailers in carload lots, f.o.b. Pittsburgh, 60 days, or 2 per cent. off for cash in 10 days.

Smooth Fence Wire.—An advance of $1 per ton was announced on Saturday of last week by the American Steel & Wire Company on all grades of Smooth Fence and Copper Market Wire. Demand is exceedingly heavy including new business and specifications on contracts, so that mills are considerably behind on shipments. Revised quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads	$1.75
Retailers, carloads	1.80

The foregoing prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

	6 to 9	10	11	12&12½	13	14	15	16
Annealed	Base.	$0.05	.10	.15	.25	.35	.45	.55
Galvanized	$0.30	.35	.40	.45	.55	.65	1.05	1.15

Chicago.—An advance of $1 a ton on all grades of Smooth Fence and Copper Market Wire was announced by the American Steel & Wire Company on Saturday, November 10. Specifications continue to exceed mill production and the new tonnage is heavy, the lateness of the season considered. Shipments are delayed from two to four weeks and on certain sizes consumers are compelled to wait 60 days. Quotations are as follows: Jobbers, $1.90, f.o.b. Chicago, in car lots; retailers, $1.95.

Pittsburgh.—We note an advance of $1 a ton made in prices by the leading mills and effective from November 9. Demand from the manufacturing trade and also from Field Fencing makers is enormously heavy and the mills are greatly behind in shipments. The continued shortage in Steel and scarcity of cars is restricting both output and shipments. The new quotations, effective from November 9, are as follows: f.o.b. Pittsburgh, 60 days, or 2 per cent, discount for cash in 10 days:

Jobbers, carloads	$1.75
Retailers, carloads	1.80

The above prices are for base numbers, 6 to 9.

Stove Hollow Ware, Etc.—As previously reported in these columns, manufacturers of Stove Hollow Ware, &c., have made a concerted advance in their quotations due to the higher cost of raw material. They assert that the change in the finished goods is very moderate in comparison with the increased cost of manufacture. On the new level the market to the retail trade is represented in a general way by the following discounts:

Stove Hollow Ware:	
Plain or Unground	60@60 and 5 %
Ground Ware	50@50 and 10 %
Enameled Ware	45 and 10@50 %
Country Hollow Ware, per 100 lb	$2.75
White Enameled Ware:	
Maslin Kettles	65@65 and 10 %
Covered Ware:	
Tinned and Turned	35 and 10 %
Enameled	45 and 10 %
Glue Pots:	
Tinned	30 and 10 %
Enameled	35 and 10 %

Sugar Kettles and English Pots are approximately 12½ per cent. higher.

Cash Discount.—In announcing the recent advance in Shovels, already reported in these columns, the constituent concerns of the Ames Shovel & Tool Company stated that their terms would revert to 2 per cent. discount for cash in 10 days. It will be remembered that a cash discount of 1 per cent. was established by these companies and some others within the last few weeks, but it has apparently been decided to yield to the wishes of the trade that the 2 per cent. discount be continued. It will be remembered that the American Hardware Manufacturers' Association at its recent meeting put itself on record as favoring the continued use of this discount, while emphasizing strict adherance to the specified 10 days' limit.

Wagon Skeins.—A 5 per cent. advance in Wagon Skeins is noted in quotations of leading manufacturers.

Cutlery.—The Cutlery market furnishes rather a noticeable exception to the general strength of Hardware products, and the marked similarity now generally observable in the quotations of manufacturers of the same lines of goods. Competition among manufacturers of Table Cutlery has been very keen ever since the dissolution of the old association and continues so in spite of the heavy volume of business and the frequent advances taking place in all other directions. Cheaper grades of Cutlery and especially Gross Goods are, of course, most affected by these conditions and are now being sold, it is claimed, at prices not much if any above the manufacturing cost.

W. A. Ives Mfg. Company.—W. A. Ives Mfg. Company, Wallingford, Conn., announces the withdrawal of all its prices on Bit Braces, Augers and Bits on account of the advance in raw material and labor. Prices of other manufacturers also reflect the strengthening tendency of this market.

Strap and T-Hinges and Wrought Butts.—There has been a general withdrawal of quotations on the part of manufacturers of Strap and T-Hinges and Wrought Butts. New quotations show an advance in the market of approximately 10 per cent., as will be observed from the new schedule of base discounts given below. Beyond these discounts the retail trade may expect about the same concessions as have ruled heretofore, which may be fairly represented in a general way by extra discounts of from 10 and 5 to 10 and 10 per cent.

Strap and T-Hinges.

Light Strap Hinges	65%
Heavy Strap Hinges	70%
Light T-Hinges	60%
Heavy T-Hinges	50%
Extra Heavy T-Hinges	66 2-3%
Corrugated Heavy Strap Hinges	70%
Corrugated Extra Heavy T-Hinges	66 2-3%

Wrought Steel Butts.

Reversible and Broad	75%
Light Reversible and Light Narrow	75%
Loose Joint Narrow Light Inside Blind, &c.	70&10%
Back Flaps, Table and Chest	70%

As an advance in these goods has been generally anticipated jobbers have doubtless made liberal purchases and it is probable that they will not be unanimous in the immediate establishment of the new prices, enabling retail merchants in some cases to continue buying at or near the prices previously ruling.

Glaziers' Points.—Quotations on zinc Glaziers' Points are noticeably firm and show an advancing tendency in that it is difficult to place orders except for immediate requirements. Manufacturers are holding their prices subject to change without notice.

Burners.—The majority of makers of Lamp and Lantern Burners have recently made moderate advances in their quotations. Their action is, of course, traceable to the high price of Brass.

Stanley Works.—Stanley Works, New Britain, Conn., has notified the trade of the withdrawal of quotations on all goods of its manufacture. It states that new schedules embodying a general advance approximating 10 per cent. are now in process of issue and will be placed in the hands of customers at an early date. The new base discounts on Strap and T-Hinges and Wrought Steel Butts are referred to elsewhere.

Lead Pencils.—The Joseph Dixon Crucible Company, Jersey City, N. J., in harmony with other makers of Lead Pencils, has made slight advances in this line of product, but which are confined to Pencils wholesaling at about $3.60 per gross and less, the advance ranging from 5 to 25 cents per gross only. The largely increased cost of rubber, cedar, brass, graphite and other materials entering into the composition of Lead Pencils warranted an advance a year or so ago, but action was deferred until it became compulsory.

Box Straps and Specialties.—Cary Mfg. Company, 19-21 Roosevelt street, New York, will on November 20 make an advance ranging from 10 to 15 per cent. on its

products, which include Universal Box Strapping, Bale Bands, Wire Box Strapping, Box Corners and shippers' specialties. This action is made necessary by the marked advances in all kinds of raw materials used in the manufacture of these products. No orders will be entered at the new prices for shipment later than February 1 next.

Rope.—The situation is strong and prices apparently well sustained on a firm and advancing Hemp market. For the season the demand is good and satisfactory to manufacturers. New York quotations are as follows: Pure Manila, 12½ to 13 cents; B quality, 11½ to 12 cents; Pure Sisal, 9 to 9¼ cents; No. 2 quality, 7¾ to 8 cents; No. 1 Jute, ¼ in. and up, 8 to 8¼ cents; No. 2 Jute, 7½ to 7¾ cents per pound.

Window Glass.—No change has taken place in the Window Glass situation, as far as can be learned. The committee appointed to induce additional plants to go into the central selling scheme is still at work, although the final results of its labors are problematical. The matter is likely to be decided one way or the other in the near future, because manufacturers who have signed, put up their forfeiture money and are holding their Glass and are naturally becoming impatient. Reports are to the effect that Glass factories generally are well supplied with workmen and are turning out a large quantity of Glass, in most instances. Buying is reported from fair to good. It is understood that the following prices are still in force: 90 and 10 and 5 for single and 90 and 20 per cent. discount for double strength Glass, from the manufacturer's list. Jobbers' quotations, from jobbers' list, October 1, 103, are as follows: Greater New York, single, 90 and 10; double, 90 and 15 per cent. discount.

Linseed Oil.—The Flax Seed market is strong and advancing in price under active buying by crushers, resulting in an advance of 1 cent per gallon in Oil. In the opinion of some, Seed has not reached the highest price before a decline will take place, which is considered possible, as the season of activity is nearing a close, crushers having about covered their requirements for winter and early spring. New York quotations are as follows, according to quantity: City Raw, 41 to 42 cents per gallon; out of town Raw, 40 to 41 cents per gallon. Boiled Oil is 1 cent per gallon over Raw. Whale Oil his advanced from 2 to 3 cents per gallon for the different grades.

Spirits Turpentine.—The local market is firm, and prices have advanced in sympathy with a strong Savannah market. Demand is confined to a considerable extent to jobbing lots. New York quotations are as follows, according to quantity: Oil Barrels, 70½ to 71 cents; Machine Made Barrels, 71 to 71½ cents per gallon.

JAMES L. NEEFUS, 103 Reade street, New York, manufacturers' direct representative in Hardware and Mechanics' Tools, has secured several new agencies, supplementing those he has had for some years. The later accounts are Carver File Company, Philadelphia, Pa., Files; Emmert Mfg. Company, Waynesboro, Pa., Quick Acting Vises; G. M. Yost Company, Waynesboro, Pa., Victor Nut Facing Machine; E. L. Post & Co., New York, Zero and Motor Metals; Adjustable Clamp Company, Chicago, Ill., Jorgensen's Adjustable Clamps, and N. C. Lane Company, Philadelphia, Pa., Steam Specialties, Damper Regulators and Oiling Devices.

GEO. BORGFELDT & Co., New York, have established their House Furnishing department in a new and commodious annex directly across the street from their main building, at 43-45 W. Fourth street. The new store and basement are devoted exclusively to House Furnishing and Hardware lines. The firm has also just completed a building in San Francisco on Folsom street, between Third and Fourth streets, where a representative line of samples will be permanently maintained.

A MEETING of the New York State Association of Hardware Jobbers will be held in Kingston, N. Y., on November 15. The members will convene at the Eagle Hotel, where the business session will be called to order at 11.30 a. m., dinner following at 2 p. m.

Retail Hardware Conventions.

A NUMBER of the State retail Hardware associations who hold their annual meetings during the first three months of the year, which, indeed, is the favored convention period for nearly all of the associations of retail merchants, have not yet selected dates for their gatherings. The associations which have thus far announced time and place for meetings are given below. Where special preparations have been made for the accommodation of Hardware exhibits by manufacturers and jobbers the fact is noted:

INLAND EMPIRE IMPLEMENT AND HARDWARE DEALERS' ASSOCIATION, Spokane, Wash., January 16 and 17. Secretary, E. W. Evenson, Spokane.

TEXAS RETAIL DEALERS' HARDWARE AND IMPLEMENT ASSOCIATION, Dallas, January 22, 23 and 24. Secretary, J. W. McManus, Waxahachie.

NORTH DAKOTA RETAIL HARDWARE ASSOCIATION, Minot, February 5, 6 and 7. Secretary, C. N. Barnes, Grand Forks.

NEBRASKA RETAIL HARDWARE ASSOCIATION, Omaha, February 5, 6 and 7. Hardware exhibition. Secretary, J. Frank Barr, Lincoln.

WISCONSIN RETAIL HARDWARE ASSOCIATION, Milwaukee, February 6, 7 and 8. Hardware exhibition. Secretary, C. A. Peck, Berlin.

ILLINOIS RETAIL HARDWARE ASSOCIATION, Chicago, February 14, 15 and 16. Hardware exhibition. Secretary, Leon D. Nish, Elgin.

NEW YORK STATE ASSOCIATION OF RETAIL HARDWARE DEALERS, Syracuse, February 19, 20, 21 and 22. Hardware exhibition. Secretary, John B. Foley, Burhans & Black Company, Syracuse.

IOWA RETAIL HARDWARE ASSOCIATION, Des Moines, February 19, 20, 21 and 22. Hardware exhibition. Secretary, A. R. Sale, Mason City.

INDIANA RETAIL HARDWARE ASSOCIATION, Indianapolis, February 20, 21 and 22. Hardware exhibition. Secretary, M. L. Corey, Argos.

OHIO RETAIL HARDWARE ASSOCIATION, Columbus, February 26, 27 and 28. Hardware exhibition. Secretary, Frank A. Bare, Mansfield.

The associations in California, Colorado, Connecticut, Kentucky, Minnesota, Missouri, New England and Pennsylvania, all of whom are in the habit of meeting in February or March, have not yet announced the dates of their conventions.

Association Notes.

The 1907 convention of the Texas Retail Dealers' Hardware and Implement Association will be held at Dallas, January 22, 23 and 24.

The announcement in our last issue in regard to the annual meeting of the North Dakota Retail Hardware Association was slightly in error so far as the date of the convention is concerned. The opening day of the meeting at Minot will be February 5 instead of February 4, and the sessions will continue on the 6th and 7th. The State Implement Association, which meets during the same week, will hold its initial session on the 7th and continue through the 8th and 9th.

The officers of the New York State Retail Hardware Association are moving energetically to make the next convention of the organization the most notable in its history, special attention being given to the Hardware exposition, the first of its kind in this State, which will be held in connection with the meeting. The sessions of the convention will cover four days, February 19, 20, 21 and 22, the Alhambra Music Hall, Syracuse, having been chosen as the scene of the gathering on account of its admirable facilities. One floor of the building will be devoted to the meetings and another to the Hardware exhibits. Space on the exhibition floor, we are advised, is being rapidly disposed of, and intending exhibitors are urged to make early application for accommodations. It is the purpose of the committee in charge of the Syracuse meeting to advertise the event to every Hardware

merchant in the State with the twofold object of increasing the membership and making the week profitable to the exhibitors. John B. Foley, secretary, with Burhans & Black Company, Syracuse, will cheerfully answer any inquiries pertaining to exhibits or meeting.

At the recent monthly meeting of the Chicago Retail Hardware Association it was decided to give the annual ball at Columbia Hall on January 13. The Committee on Arrangements consists of A. J. Englehardt, Harry Fair and Martin Englehardt. At the December meeting officers for the ensuing year will be elected.

REQUESTS FOR CATALOGUES, &c.

The trade is given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS for catalogues, price-lists, quotations, &c., have been received from the following houses, with whom manufacturers may desire to communicate:

FROM NICK KERZ, Indianapolis, Ind., who contemplates adding a stock of Cutlery and allied lines.

FROM GRANT-HASSON HARDWARE COMPANY, Morristown, Tenn., which on January 1 will succeed the Grant Hardware Company. The officers of the new concern, which has been incorporated with a paid-in capital of $25,000, will be E. M. Grant, president; J. D. Hasson, vice-president; William Lyle, secretary and treasurer, and Charles Andre, manager. The company will do a wholesale and retail business in Hardware, Stoves, Tinware, Implements and Vehicles.

FROM THE RUBEL HARDWARE COMPANY, which has been organized at Lebanon, Ky., with the following officers: John Rubel, president; W. H. Rubel, vice-president; W. W. Knott, secretary, and J. M. Knott, treasurer. The capital, $15,000, has been paid in. This company will occupy a room in the new Masonic Temple, 36 x 128 ft., and a warehouse 40 x 60 ft. A jobbing business will be done in the following lines: Builders' and Staple Hardware, Guns, Cutlery, Stamped and Enameled Ware, Stoves and Ranges, Roofing, Pumps, &c. The company is in the market for shelving and other fixtures to be delivered about February 1, and also requests catalogues and other printed matter relating to the above lines.

FROM PLANTERS' HARDWARE COMPANY, Wadesboro, N. C., which expects to build a new store, up to date in all its appointments. In this connection the company will be pleased to receive printed matter and other particulars relative to modern store fixtures and supplies.

W. G. THOMAS, who for a number of years has been one of the jobbing firm of Thomas, Barnes & Miller, Memphis, Tenn., has disposed of his interest in that concern and has entered into partnership with Phillip Pidgeon, formerly of the Manogue-Pidgeon Iron Company, Memphis. The latter concern has been reorganized under the style of the Pidgeon-Thomas Iron Company.

SURPLESS, DUNN & Co., manufacturers' agents, 74-76 Murray street, New York, have been appointed sales representatives for all Eastern and export territory of Vaughan & Bushnell Mfg. Company, Chicago, whose large and varied line of Hand Hammers, Adze Eye Nail and Machinists' Hammers and other tools is widely and favorably known in the trade.

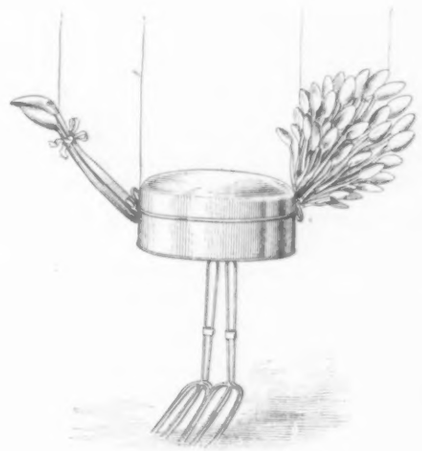
THE death of Geo. H. Newton dissolves the partnership with Almon P. Hill in the Hardware firm of Newton & Hill, Fort Edward, N. Y. Mr. Newton had been the senior member of the firm for 23 years. He was also interested in the coal business, and owned much real estate in that section of the State.

THE SCRANTON AXLE WORKS, Scranton, Pa., have arranged with C. K. Turner & Son, 116 Broad street, New York, to represent them for export trade.

THANKSGIVING WINDOW.

WE are indebted to F. B. Mallory, Flemington, N. J., for the suggested Thanksgiving window device shown in the cut. It represents the traditional turkey, but is made entirely of kitchen goods, according to the following directions:

Take a Roasting Pan for the body of the turkey, two Wire Toasting Forks for the feet and legs, two long Metal Spoons for the neck and head, and a cluster of all sizes of the same with different lengths of Handles with the bowls out, for the tail feathers. The whole should be wired together with fine Wire, and then suspended by four invisible wires properly spaced, according to the size of the bird, as indicated by dotted lines in the illustration. The wires may be fastened to Screw Eyes in the ceiling of the window and should extend down so as to allow the feet of the turkey to rest upon the floor.



A Hardware Turkey for Thanksgiving Window Display.

Letters from the Trade.

Our readers are invited to discuss in these columns questions of trade interest connected with the manufacture or sale of Hardware. We shall be pleased to have a free expression of opinion on subjects deserving the attention of Hardware merchants and manufacturers.

KEEPING TRACK OF TOOLS LOANED.

FROM A HARDWARE FIRM IN NORTH CAROLINA.—Will some reader of *The Iron Age* advise us as to the best way to keep up with Tools that we Hardware dealers have to lend out? We lend our Wire Stretchers, Monkey Wrenches, Tape Lines, Hammers, Hatchets, Pump Augers, &c. We lose about half of them in spite of all that we can do. We think perhaps some one has devised some plan to avoid losing them.

THE MATTER OF CASH DISCOUNT.

FROM A MICHIGAN MERCHANT: We are Hardwaremen doing business in a small way in a very small town, but we are much interested in the discussion in *The Iron Age* relative to cash discounts. It is true that 2 per cent. discount, ten days, is an enormous interest to pay for the use of money. But it seems a little different in this case, it being to our mind more of a premium for prompt payment and only reduces the percentage of profit to that extent.

It will be taken for an axiom that no one ever lost a cent by the man who discounts his bills. We do a cash business, but in order to do it we are obliged to make prices that amount to more than 12 per cent. per annum on our sales. We discount all our bills, however, and the catalogue houses do not cause us to lose any sleep.

The fellow that takes advantage of 2 off 10 days, and makes it 2 off 20 days, is a different proposition.

Trade in China.

The following advices in regard to Chinese trade are from John L. Sardy, of John L. Sardy & Co., Snow Hill, London, E. C., England, who is making a business trip around the world.

CHILDREN think when it rains at home it must be raining all over the world. They do not know. The manufacturer who has never been beyond his trade at home thinks it everything. He does not know. Let him go into the markets of the world and he will find out. Among other things he will find how little he really does know. Intercourse between nations is the soul of trade. What would Great Britain be to-day if her trade were confined to the British Islands? As it is, the manufacturers of those little islands have been for years and years the greatest exporters the world has ever known. They have sought the trade and met with their reward. The United States with its enormous home trade was for many years indifferent to foreign business. It is gratifying to know this is changed and to-day the energetic American commercial traveler jostles shoulders with his rivals from England and Germany throughout the world.

Chinese Imports Have More Than Doubled in Ten Years.

As for trade in China, it is interesting to note that beginning with a net import in 1896 of the value of nearly two hundred and three millions of Haikwan taels (a tael is worth about 73 cents), there has been a steadily increasing demand for foreign goods until, in 1905, it has more than doubled, the net figures being 447,100,791 taels. Great Britain leads with over 86,000,000 taels, closely followed, however, by America with nearly 77,000,000, Japan coming in third with about 61,000,000. Germany is credited with less than 15,000,000. The others are not in it, and Spain glories in the smallest of the lot with 478 taels.

Imports of American Goods

have advanced erratically, the figures being 30,000,000 in 1902, 25,000,000 in 1903, 29,000,000 in 1904 and last year about 77,000,000 taels, notwithstanding the boycott, of which something anon. Out of the total, Shanghai takes more than half, Tientsin next and Canton and Hankow about even, with Hankow rapidly jumping ahead.

Opium, cotton goods, petroleum and flour form the bulk of the imports. The quantity of Metal and Metal Goods ran largely in excess of previous years. About one-half of the Carriages and Bicycles came from England. Japan leads in the supply of Clocks and Watches, presumably most of them copies of American makes. China goes to Japan for nearly all her coal.

The Value of Hardware Imported

reached nearly 900,000 taels, of which Great Britain supplied about two-fifths, the rest coming from America, Japan and Germany. It may be surprising to learn that Belgium leads in the supply of railroad plant, the figures for that country being over 1,700,000 taels.

Most of the flour comes through Hong Kong, although the United States sent a considerable quantity direct. The bulk of the flour trade in Hong Kong is in the hands of a Canadian, who has been importing American and Canadian flour for the last 20 years. He is now constructing a flour mill in Hong Kong with a capacity of 8000 bags per day and will shortly erect a second one of similar capacity. The milling machines are all American, also the iron water pipe for washing the wheat.

In China it is Against the Law

to export any foodstuffs, but Hong Kong being a British possession, is exempt, which accounts for the large exportations from that port, which, by the way, is reputed to have a larger shipping tonnage passing through its impregnable harbor than any other port in the world, something which may astound the untraveled individual.

Evidences of the Chinese Boycott Against American Goods

are not by any means prominent in the chief centers of trade, but the boycott exists in the interior of China. Under a recent date the *Canton Daily News* publishes the following:

REVIVAL OF THE BOYCOTT.

The *Tien Ch'u Pao* and other Chinese papers are advising their readers to renew the boycott of American goods. The former says: "The boycott of American goods has of late died away, apparently leaving no trace. In all directions we notice that the selfish merchants are buying American goods and publicly exhibiting them in the shop fronts. They surely do not know what shame is! Yesterday, 26th, the body of the boycott-hero arrived in Canton, and the whole town turned out to receive it. The patriotic enthusiasm was great and the interest in the movement was revived. Everywhere the cortege passed the shops dealing in American goods had removed them and dared not exhibit them openly. Should they again carry on their trade in these goods, then the soul of Feng Hsia Wei will frighten their souls or their bad consciences will lead them into the right way again. In this way only will it be possible to annul the treaty which prevents Chinese immigration to America.

Naturally enough, and more than likely justly, the sentiment among Americans in China is on the side of the Chinese. We admit vagabonds and anarchists freely and yet exclude a wonderfully industrious people—a people of the oldest dynasty in the world. Not only industrious, but clever.

A Chinese Locksmith.

As an instance, an American traveler had the misfortune to lose the key of his dispatch box, fitted with a modern American five-tumbler Lock. This happened just on the eve of his departure from Shanghai to Hong Kong and he felt sure it would be necessary to break open the box to get at his papers; but instead at Hong Kong he spoke to his Chinese servant about the predicament, who told him he would get a Chinaman to open the box and fit a new key to it without delay. Presently the Chinese locksmith arrived with a very small wooden box containing a kit of Tools, consisting of one or two worn-out Files and bits of broken ends of steel umbrella ribs. The chances are he had never seen such a Lock before, but he sat down to his work as though he had made the Lock himself and in a few minutes, with one of those umbrella ribs, he had the box open and an hour later came back with two keys to fit it.

A Wood-Turning Shop.

On the Wei Hei Wei road in Shanghai is a good turning shop, small but thrifty. It boasts of one lathe only and the Chinese proprietor made it himself in about two days. It perhaps cost him $2. The apparatus consists of a rough-hewn wood frame about 7 ft. long and 4 ft. high. Between the sides of the framework, or what might be called the shafts, sits the workman. Beneath him are two bamboo treadles hinged at one end. To these treadles a leather thong is attached, passing from one to the other and wrapped several times around a wooden spindle which revolves backward and forward as the workman moves the treadles up and down with his feet. At what might be called the chuck end of the spindle is a cavity about 4 in. in diameter, slanting inwards. Into this a wooden circular piece with a hole in the center is driven. This is the chuck, and although our celebrated American makers would not turn green with envy, they would marvel at the sight of it and more so at the deftness of the Chinese wood turner, who drives the piece to be turned into the hole in this wooden chuck and centers it by a few strokes of his hammer in as many seconds. The tool rest looks like a mallet, the handle end stuck into a slot and held parallel with the spindle, this position being maintained by the chest of the workman steadily pressing against the head of the so-called mallet.

The Tools Used for Turning

are quite as crude as the lathe. There are very few of them, all hand made and unfinished except the cutting edge, which does the work perfectly. The roughing tool is bent inward at the edge like a hook, and that "heathen Chinee" knows how to use the hook. The way he makes the chips fly as the wooden spindle revolves back and forth is marvelous. Never a cut too deep; always the same steady pressure on the wooden tool rest against his naked chest. And those legs of his! Up and down they go on the bamboo treadles like a walking beam. Every working force of the man is brought into play and he laughs while he labors. He laughs, this skilled Celestial,

earning per day a sum our workmen would spend in car fares, and yet labor strikes are unknown in the Celestial Empire.

China Is Not a Good Market

for American carpenters' Tools. The Chinese carpenter can do better work with Tools of his own construction. Sometimes he uses imported Saw Blades and makes the wooden part of the Saw himself, but more often than not he makes the Blade as well, and this out of hoop iron taken from cotton bales.

Sawmills Are Generally Unknown

in China. There are a few belonging to the largest foreign lumber importers, but by far the greater part of the sawing is done by hand. The Saw Blade is set at an angle in a wooden frame something like the American Bucksaw. The object of the angle is to allow the frame to run clear of the work. The Saw Blade is narrow and for sawing boards out of logs is about 4 or 5 ft. long. The log is trussed up at one end, the Saw pit being usually in an open field under the shade of trees, and two Chinamen go to work, one on top of the log and the other beneath, pulling the Saw back and forth between them. The work is slow, but cheap. Logs quite 2 ft. in diameter are dealt with and the sawmanship is wonderfully accurate.

Illustrations of Economy.

The natives of the Far East can teach economy. A Pail manufacturer need not go there, and for that matter a Dust Pan maker would be out of place. The Standard Oil Company is responsible for this. What could make a better Pail than a Kerosene Can with the top removed and a stick fastened across for a handle. They are seen all over the place, and without them the Chinese, men, women and children (for they all work), would be unhappy. As it is they like them so much that they appear to prefer carrying two, one slung on each end of a bamboo rod carried across their shoulders.

As for the Dust Pan, take a Kerosene Can, cut it across diagonally from end to end, and there you have two Dust Pans, serviceable and certainly not costly. Sometimes a wooden handle is fastened at the back to avoid stooping over.

Another use the indispensable Can is put to is for cooking. The Can is placed across a few bricks with a fire beneath, and there you are—Pot and Stove complete cost nothing.

Paper bags show another instance of their economy. They make these themselves out of old newspapers, which cost very little and the labor less. It is truly a land of cheapness, a land of happy and thrifty people—400,000,000 of them.

Unlike the Japanese, the Chinese Use Wheelbarrows,

and no end of them at that. The Barrow is rudely constructed and quite unlike anything of its kind in any other part of the world. The wheel, about 3 ft. in diameter, is placed in the center of the framework. On each side is what might be called a platform, from which the two handles extend well spread apart. The axle or spindle on the wheel is usually made of wood and the supports on which it turns are always wooden ones; hence no horn is required to announce the approach of a Chinese Wheelbarrow; the continual squeak does that. The dexterity with which the Chinaman balances the Barrow is marvelous and the load he carries more so. It makes no difference whether the load be merchandise or passenger or whether it is distributed evenly on the platform each side of the wheel. It is no unusual thing to see from six to eight Chinese on a Barrow pushed by a single fellow countryman; at other times one only, perfectly balanced on one side. Transportation in connection with agriculture is accomplished by means of these Barrows, hence there is no market in China for American farm wagons.

American Goods Imported.

The House Furnishing Goods to be seen in Shanghai are mostly English because there are more English residents, bar the natives, than any other nationality. American Trunks, Lawn Mowers, Garden Tools, Ice Cream Freezers, Camp Stools, Camp Beds, Cooking and Heating Stoves, Agate Ware Cooking Utensils, Clocks, Brooms and a few Lamps come pretty near forming the sum total of American made articles.

Why More American Goods Are Not Imported.

One very cogent reason why more American goods are not imported into China is the unreasonably long time taken to execute orders. Goods from England arrive in about three and one-half months from date of order, whereas the American manufacturer takes it easy and from five to six months elapse before the goods come to hand. It is the impression in China that the fault lies with the manufacturer. The time required for transit via Suez is about two and one-half months, and there are many instances of orders being actually in the manufacturers' hands for two or three months before shipping. This is wrong and certainly hurts our Chinese trade.

The Indispensable Comprador.

What the foreign firms in China would do without the comprador goodness only knows. Of course he is a Chinaman, honest, clever and oftentimes rich. He is the manager and almost everything else. He is in charge of all the Chinese employees and full of responsibility. He receives a commission on all the business done by the firm. In Shanghai this usually is ¼ to ½ per cent., without guaranteeing the accounts. In Hong Kong and Tientsin he guarantees the accounts and gets a larger commission. The credits in those two places run from two to three months, but in Shanghai transactions are usually for cash, the Chinese dealer paying when he gets the goods, or "cargo," as everything is called. The comprador is the sole source of information as to the standing of the dealers, but he knows what he is about and his advice can be relied upon. Chinese mercantile honesty sets a standard. There are few failures, and those are honest ones. If you want money you get it from the comprador. Clerks take advantage of this and run up bills with shop keepers, giving a memorandum, or "chit," as it is called, on the compradore. The firm retains a part of the clerk's salary to recoup the comprador, when the "schroff" calls to collect on behalf of the shop keeper. The schroff is an outdoor man, a Chinese town salesman, collector, &c.

Shop Equipment Is Mostly German.

Up to the present time China has been singularly neglected by American makers of machinery, whereas Germany has been active in the Chinese market, and therefore the greater part of shop equipments are German; but the majority of the cotton mills formerly owned by the Chinese are now controlled by the Japanese and are equipped almost entirely with English machines.

Machine gun makers are especially active in China. The reason is because the viceroys are anxious to equip their armies with up to date arms. Of course there is no means of finding out how many have been sold, as naturally this is concealed, but it is known that two have come in from England, two from Germany and one from France. It is also said that the Japanese have sold a lot of their old field guns to a viceroy who wanted to make a showing.

The Han Yang Steel Works at Wuchang, opposite Hankow, the great tea port at the head of deep water navigation on the Yangtsi River, are equipped with both American and German machinery and now are about to be entirely re-equipped with modern machine tools. It is said a well-known American company was among the successful bidders for the heavy machinery for this plant.

Railway Development.

Hankow is the center of the railway development now going on in the interior of China. A Belgian syndicate has already constructed the railway from Hankow to Pekin over which a 36-hr. service is now being operated between these two great Chinese cities. The proposed railroad between Hankow and Canton was originally an American concession, the greatest railroad concession ever granted in China, but the Americans only constructed 37 miles, this from the Canton end. The reason no more work was done was on account of the suspicions of the Chinese authorities that the ownership of the line would ultimately fall into Russian hands, and as it was known the American promoters, for reasons of their own, were seeking a purchaser the viceroys at Canton and Hankow

felt compelled to repurchase the concessions at a cost, it is said, of $7,000,000. They are now trying to build the line and finance the enterprise through Chinese banks, the successful outcome of which is considered very doubtful. If Russia had not been obliged to divert her attention from this railroad by the war with Japan she could not only have controlled the line between Pekin and Hankow, now owned by the Belgian syndicate in which Russian influence dominates, but with the acquisition of the American concession might have had a trunk line through the heart of the Flowery Kingdom, crossing the center of the great Yangtse Valley.

NORVELL-SHAPLEIGH HARDWARE COMPANY'S CHRISTMAS CATALOGUE.

A CATALOGUE of goods especially suitable for Hardware merchants to feature during the Christmas season has just been issued by Norvell-Shapleigh Hardware Company, St. Louis, Mo. The book has a cover in holiday colors, and contains 160 pages referring to Cutlery, Silver Plated Ware, Flat Ware, Clocks, Lamps, Andirons, Fire Sets, Skates, Sleds, Children's Wagons, Velocipedes, Bicycles, Sporting Goods, &c. A commendable feature of the book is the fullness of the descriptive matter accompanying the illustrations of all goods listed. With the aid of these descriptions it should be possible for merchants to place mail orders with an intelligent idea of the character of the goods ordered. In referring to the catalogue the Company writes :

We have gotten out this catalogue for the purpose of interesting the Hardware dealer in the sale of Christmas goods. Usually from the 15th of December to the 15th of January the Hardware dealer is sitting around in his store with nothing to do, while the drug store, stationer, notion shop, are worked to death. This is a condition that we do not think should exist. We believe that the Hardware merchant should be extremely busy during the holiday season and that he should make a desperate effort to secure some of the holiday trade. We believe if the Hardware merchant will devote a little more energy to the sale of Christmas goods he will be surprised at the sales and profits he can make.

COLONEL WOODRUFF ELECTED GOVERNOR

COL. ROLLIN S. WOODRUFF, who has just been elected Governor of the State of Connecticut, is the senior member of C. S. Mersick & Co., New Haven, Hardware merchants. He was promoted from the Lieutenant-Governorship, and a great majority, the largest ever given a candidate for Governor in an off year, bespeaks his popularity. Born in Rochester, N. Y., 52 years ago, the son of Rev. Jeremiah Woodruff, a Presbyterian clergyman, he was early thrown on his own resources by the death of his father. Wishing to contribute to the support of his mother he found employment in the Hardware store of Smith & Kimberly, New Haven. He was then 16 years of age. By faithful, intelligent work he earned promotion and obtained a mastery of the business. After a few years he went with C. S. Mersick & Co., and helped to develop the business. After a time he was admitted to partnership, and is to-day the head of the firm. Two years ago he was elected Lieutenant-Governor of Connecticut. Governor Woodruff affords a fine instance of a man who has succeeded admirably in business, as well as in the large affairs of government.

THE business of E. S. Hulbert & Co., Bernardston, Mass., manufacturers of Cutlery, has been incorporated under Massachusetts laws as E. S. Hulbert & Co., Incorporated, with capital stock of $25,000 and these officers: President and treasurer, Alonzo Alvord; clerk and general manager, Henry L. Crowell; directors, Messrs. Alvord and Crowell and F. B. Dennison, who is the factory superintendent. The corporation takes over the real estate owned by the late E. S. Hulbert and will continue the manufacture of the special line of high grade Cutlery which has been known to the trade since the business was established in 1846. The company has recently installed a new engine and it is the purpose of the management to increase the output of the factory.

PRICE-LISTS, CIRCULARS, &c.

Manufacturers in Hardware and related lines are requested to send us copies of catalogues, price-lists, &c., for our catalogue department in New York; and at the same time to call attention to any new goods or additions to their lines, of which appropriate mention will be made, besides the brief reference to the catalogue or price-list in this column.

MCKENNA BROS. BRASS COMPANY, Pittsburgh, Pa.: Illustrated catalogue of Faucets for the wine and liquor trade.

CLEVELAND STAMPING & TOOL COMPANY, Cleveland, Ohio: Illustrated catalogue and price-list of Lava and Volcanic Enameled Ware and Polished and Tinned Goods.

LEE CHAIR COMPANY, Oneida, N. Y.: Illustrated booklet referring to Reliance Mop Wringers.

J. STEVENS ARMS & TOOL COMPANY, Chicopee Falls, Mass.: Illustrated booklet referring to Stevens Firearms as a holiday line, reproducing advertising matter offered to the trade, &c.

OHIO SHOVEL & STAMPING COMPANY, Canal Dover, Ohio; J. C. McCarty & Co., selling agents, 10 Warren street, New York: Catalogue of Shovels, Spades, Scoops and Ditching Tools.

CHICAGO FLEXIBLE SHAFT COMPANY, Chicago: Illustrated catalogue of Horse Clipping and Grooming Machines, Sheep Shearing Machines, &c.; also booklet referring to Clark Carriage Heaters and Foot Warmers.

LANCASTER FORGE & BLOWER COMPANY, Lancaster, Pa.: Catalogue No. 28, referring to Forges, Blowers, Drills, Fire Upsetters, Angle Cutters, Punches and Shears.

MAINE MFG. COMPANY, Nashua, N. H.: Illustrated catalogue of White Mountain "Stone White" and other Refrigerators.

NARRAGANSETT MACHINE COMPANY, Providence, R. I.: Illustrated catalogue of Steel and Wood Lockers for factories, gymnasiums, offices, &c., with lists of stock sizes and descriptions of parts, locks, benches and other accessories.

GEORGIA PLOW WORKS, formerly Atlanta Plow Works, Atlanta, Ga.: Catalogue and price-list of Finished Steel Plow Shapes, Single and Double Plow Stocks, Cast and Carbon Plows, Ark Side Harrows, Cotton Scrapers, Garden Plows, &c.

SPECIALTY MFG. COMPANY, St. Anthony Park, Minn.: 1907 price-list of Easy Emptying Grass Catchers, Mechanics' Aprons, &c.

NIAGARA FALLS METAL STAMPING WORKS, Niagara Falls, N. Y.: Illustrated printed matter relating to Hame Chains, Wall and Veneer Ties or Brick Bonds, Steel Breast Chains with solid steel center, Cut Link Steel Spreader Chains, Steel Stallion Chains, Aluminum House Numbers and Combined Picket Pin and Swivel. Press and Die Work, Drop Forging, Screw Machine Work, Wire Forming, &c., is done to order.

HURWOOD MFG. COMPANY, Bridgeport, Conn.: Circulars referring to Hurwood Food Choppers and Lanterns.

KEYSTONE MINE SUPPLY COMPANY, Pittsburgh, Pa.: Catalogue and price-list No. 2, referring to Miners' Tools and Supplies, Oils, Greases, &c.

THE JOHN M. ROGERS WORKS, Gloucester, N. J.: Price-list devoted entirely to High Speed Reamers with inserted blades, which are adjustable.

THE EDWARDS MFG. COMPANY, Cincinnati, Ohio: Illustrated catalogue relating to Conductors, Elbows, Eaves Trough, Hooks, Hangers and Fasteners, Gutters, Crestings, Finials, Roofing, Siding, Flashing, Corrugated Sheets, Ceiling and Siding, Metal Shingles, Fireproof Windows, Sheet Metal Building Fronts, Bay Windows, Window and Door Caps, Cornices, Moldings and Enrichments, &c. A view is given of the company's extensive new plant.

FORBES CHOCOLATE COMPANY, Cleveland, Ohio: Illustrated matter devoted to Tack Puller, Can Wrench and Holder, Glasbrite, Window and Floor Cleaner, Fruit and Vegetable Slicer, Automatic Scissors Grinder, Egg Separator, Pillow Sham Holder, Roller Press Mop Wringer, Stove Pipe Shear, Egg and Cream Whip, &c.

CUTLERY CATALOGUE OF MARSHALL-WELLS HARDWARE COMPANY.

MARSHALL-WELLS HARDWARE COMPANY, Duluth, Minn., has just issued an imposing Cutlery catalogue of nearly 500 pages. The edition is a part of the company's general loose leaf catalogue, on which it has been working for over two years and which it expects to complete and issue about January 1. As in the case of the Stove catalogue, issued some time ago, the entire composition, electrotyping, printing and binding were done in the company's own catalogue department. Besides Pocket and Table Cutlery, Razors and Supplies and Sterling and Silver Plated Flat Ware, the lines covered include Silver Plated Hollow Ware, Cut Glass, Hall, Mantel and Alarm Clocks, Watches and Holiday Novelties. On the back of the catalogue are views of the company's extensive warehouses at Duluth, Portland and Winnipeg.

THE LOCKWOOD COMPANY.

THE LOCKWOOD COMPANY, 97 Chambers street, and 79 Reade street, New York, is a newly organized company succeeding the Allerton-Clarke Company at the same address. The business will be continued along the same general lines as heretofore, representing the same manufacturers, principally among which are the Lockwood Mfg. Company, Builders' Hardware; F. & N. Lawn Mower Company, F. E. Kohler & Co., Seneca Chain Company, Starr Bros., Bell Company, Nicholls Mfg. Company, Weldless Framing Squares; C. J. Kimball Company, high grade Hand Tools; Chicago Flexible Shaft Company, and a number of others well known to the trade. The same working staff will be retained in the New York store, where a large stock of goods is carried. The officers are: Alfred J. Wright, president, formerly with the Yale & Towne Mfg. Company; George B. Main, vice-president; Richard Battin, Jr., treasurer, and W. G. Van Ness, secretary.

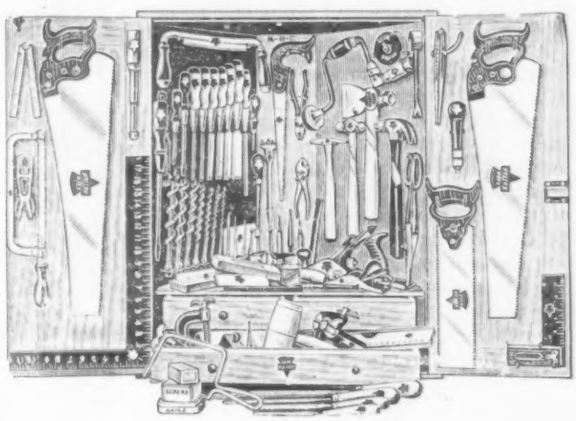
MISCELLANEOUS NOTES.

Pike Mfg. Company.

In addition to goods shown in its former catalogue the new catalogue of the Pike Mfg. Company, Pike, N. H., and 151 Chambers street, New York, lately issued, represents additional grades of axe and oil stones, Arkansas powder, various brands of razor hones, knife sharpeners, Stonoil, a fine lubracant for oil stones, razor hones, guns, revolvers, etc., combination oil stone box, selling assortments of stones in boxes, &c.

The Keen Kutter Tool Cabinet.

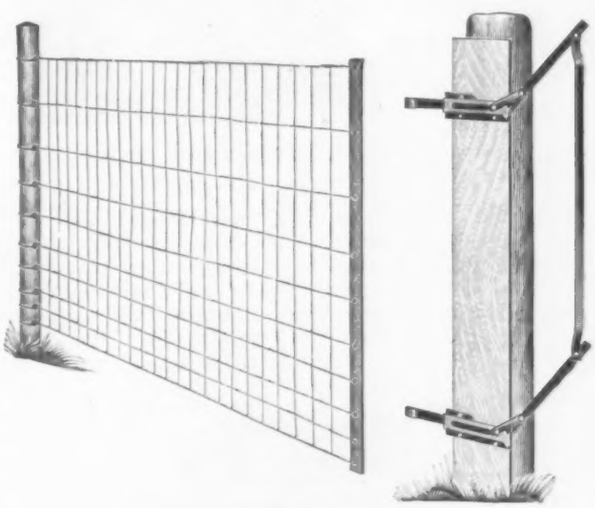
The usual limitation of a manufacturer of tools to but one or a few lines makes it necessary in the assembling of an ordinary assortment for a tool cabinet to draw upon various makers for the particular product of each. This is where an especial advantage is derived by the Simmons Hardware Company, St. Louis, Mo., whose Keen Kutter line covers practically everything needed in an assortment of tools. One make of tools put up in cabinet form also aids the retail merchant materially in swelling the volume of his sales, as the householder and man of the shop are often attracted by the cabinet idea and will purchase a set of tools, when sold as such, where purchases of all of the individual pieces would never be made. This may be considered particularly true of the householder, and has been provided for by the maker of the Keen Kutter line by arranging assortments of tools of the highest quality, not only for cabinets of 85 or 86 pieces, but for smaller sizes down to the handy household kit. The cabinets are made of stained oak, carefully fitted, so that each tool has its own distinct place. The location of a tool is thus always known, and the use of the cabinet makes easy keeping it in first-class condition. The dimensions of tool cabinet No. K11C, shown herewith, which is fitted with 85 tools, are as follows: Outside, 32 in. high, 26 in. wide at front, 7 in. wide at back, 7 in. deep at side, 13½ in. deep at center; inside, 30½ in. high, 24½ in. wide at front, 5½ in. wide at back, 4 in. deep at side and 12 in. deep at center. It has two paneled doors and three inside drawers, 3 in. deep. It is of antique finish, finely varnished and hand rubbed, and has brass plated ball tip steel hinges, two brass hangers on back and brass cylinder lock with two steel keys. Among the tools included in this assortment are two planes, six different kinds of saws, a variety of hammers, an assortment of bits, chisels, awls, wrenches, &c. The weight of the cabinet, which is designed to fit into a corner, with tools is about 97 lb. Other cabinets offered contain 86, 50, 44, 30, 21 and 17 tools of various assortments. The company also offers Chipaway tool cabinets from 50 down to 17-tool sizes, the Bull Dog tool set, the Ideal tool set and the Handy Household kit.



The Keen Kutter Tool Cabinet.

The Charles Wire Stretcher and Locking Device

The Charles wire stretcher and locking device shown in the accompanying illustration and manufactured by the C. F. Smith Company, De Kalb, Ill., is designed as a fastening for a field fence gate. It is often desirable to make an opening in a fence between fields for moving stock or machinery from one field to another, and to obviate the installation of a more expensive gate this attachment can be speedily adjusted, and when locked will prevent this section sagging. The horizontal wires are fastened to either a strip of wood or a steel bar, and the stretcher is secured to an 8-in. board nailed to a post. Two hooked arms operated by a lever engage the grip or bar to which the fence wires are fastened, and with a downward movement of the lever the wires are stretched taut and the gate is locked. The cast parts are malleable and the arms and lever are constructed of steel bars.



The Charles Wire Stretcher and Locking Device.

Acme Pencil Combination.

The International Electrical Mfg. Company, 19 East Fifteenth street, New York, is manufacturing at its Jersey City factory the Acme pencil combination here shown. It is 4⅝ in. long closed and is furnished in a neat metal bound leather case for pocket carrying. It can be variously used as an ordinary pencil, Fig. 1; to sweep pencil or ink curves in which revolving arm is used, Fig. 2, and as a plain compass with two metal points, Fig. 3. The milled thumb nut regulates the tension of the wings to get fixity in forming curves and circles. The width of ink line from light to heavy can be graduated by pushing the spring D forward or back. The lead B is moved up or down or recessed by means of E, which is a part of the steel point F. Thus either lead or steel point can be used. The other wing has a steel needle-like point held in its place friction tight. The various parts are made of sheet metal, and the thinner outer case is plated. Extra leads are supplied in a small wood box, and the whole outfit can be profitably retailed for 25 cents. It is especially recommended for students, mechanics, draftsmen, engineers, and others using implements of this sort.

Fig. 1.—Used as a Pocket Pencil.

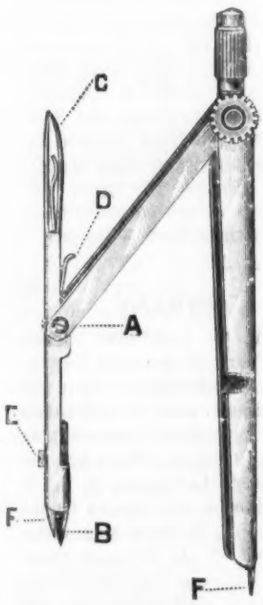


Fig. 2.—The Various Parts.

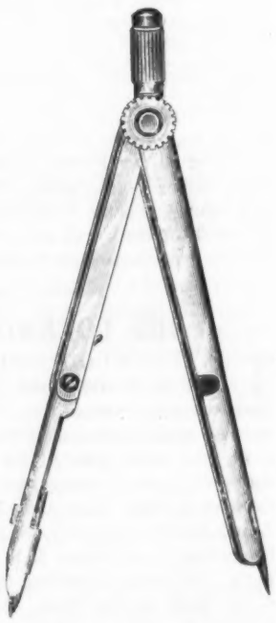


Fig. 3.—Used as a Compass.

Acme Pencil Combination.

Auto Strop Safety Razor Outfit.

The Auto Strop Safety Razor Company, 350 Broadway, New York, has put on the market the Auto strop safety razor and strop complete, here shown. A unique feature is the ease and rapidity with which the stropping is accomplished, requiring neither knowledge nor skill on the user's part. Although the blade can be quickly removed, it is not necessary, as after rinsing thoroughly, it can be stropped before returning to the case by pushing a small trigger at back of razor frame, which moves the guard or comb forward sufficiently to have the two end guards release the blade so it can be turned to a vertical position. The handle end of the leather strop is then slipped under the friction roller, which, by means of the small end gear wheels, automatically throws the blade in the opposite direction to movement of frame in stropping process. The blade is made of high grade razor steel, wafer-like in gauge and of uniform thickness throughout. Blades can be used a long time with the customary stropping and easily honed or resharpened, but 12 blades are sent with each outfit, there being two receptacles for "Unused" and "Used" blades, so lettered. The case, with hinged cover and fastener, is 3¾ in. long, 2⅛ in square, and neat in appearance. The strop is retained in the upper portion by slipping it folded under a metal rod, the razor frame with permanent handle fitting snugly into a place made for it and velvet lined. The leather strop is 1½ x 14 in. long over all, giving over 10 in. of clear stropping surface. The working parts are made of German silver and the whole is finely plated. The razor case is put up in a white double pasteboard box.

Fig. 1.—Auto Strop Safety Razor.

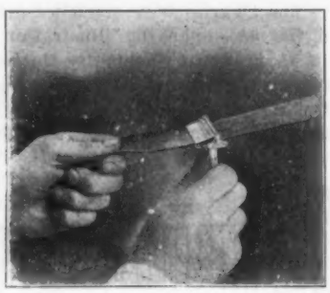


Fig. 2.—Stropping the Razor.

Fig. 3.—Complete Outfit.

Waist and Skirt Hanger.

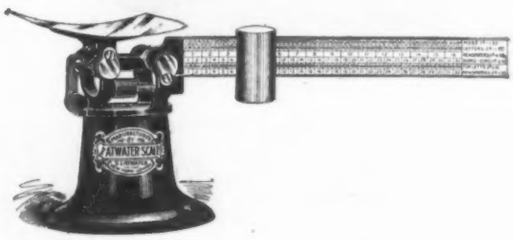
The combination hanger here illustrated is made by the Wire Goods Company, Worcester, Mass. It is intended for skirts and waists, the former being hung by their loops to the hooks below the arm and the latter spread over the arm in the usual way. The neck of the hanger has an offset to prevent wrinkling or stretching the garment out of shape. The device is made of No. 9 wire, retinned, and is 17 in. long. Half a gross are packed in a case.

Waist and Skirt Hanger.

William Lang and Bert Garland, Lisbon, N. H., have formed a partnership as Garland & Lang, to conduct the Hardware, Tinware, plumbing and heating business.

Atwater Balance Postal Scales.

S. I. Atwater, 369 Broadway, New York, is just putting on the market the Atwater balance postal scales in three sizes, one of which is here reproduced. The scale, while indicating rates applicable uniformly to the United States, Canada and Mexico on merchandise, letters, newspapers, books and circulars, has also lines showing weights and rates for foreign letters and newspapers in the International Postal Union, based on 5 cents per half

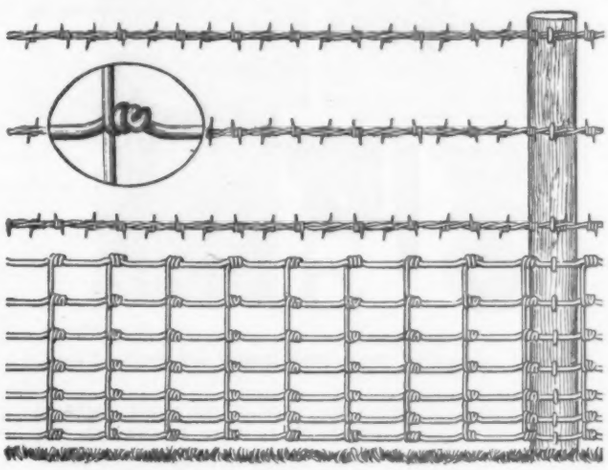


Atwater Balance Postal Scales, Oval Base.

ounce for letters. All this data is recorded on a celluloid strip, which is riveted to the arm, but scales carrying metric weights and other monetary systems, making them available for foreign trade, can be furnished by merely changing the celluloid strip and regraduating the notches at top of arm to harmonize. The upper working parts of the scale are polished brass and the base japanned. The base, a long oval in shape, tapering upward, gives it an attractive form and appearance. The scales have capacities of 16, 32 and 64 oz., listing respectively $3, $4 and $5 each.

National Field and Hog Fence.

The De Kalb Fence Company, De Kalb, Ill., has added the national field and hog fence shown in the accompanying illustration to its already complete line of field fencing. All of the horizontal bars are made of No. 10 wire and the pickets are of No. 12 gauge, spaced 8 in. apart and wrapped around each bar very tightly inside a crimp, which, it is claimed, prevents slipping and at



National Field and Hog Fence.

the same time provides for contraction and expansion. The 28-in. fence, with eight bars, has a breaking strength of nearly 6 tons, and either a 23, 26 or 28 in. hight, with three strands of barb wire above, is suggested as an ideal fence for all farm purposes. The spacing between bars of the 28-in. fence, beginning at the bottom, is 2¾, 3, 3½, 4, 4½, 5 and 5½ in., and of the 26-in, 3, 3½, 4, 4½, 5 and 5½ in. The fence can be furnished in the following sizes: 58-in., 12 bars; 49-in., 11 bars; 47 and 41 in., 10 bars; 28-in., 8 bars; 26 and 23 in., 7 bars.

The Safety Snap.

National Safety Snap Company, Wilmington, Ohio, is offering to the trade the new safety snap shown in the accompanying cuts. It is made of spring steel, nickel plated, is attractive in appearance and is referred to as strong and durable and as safe as the name implies.

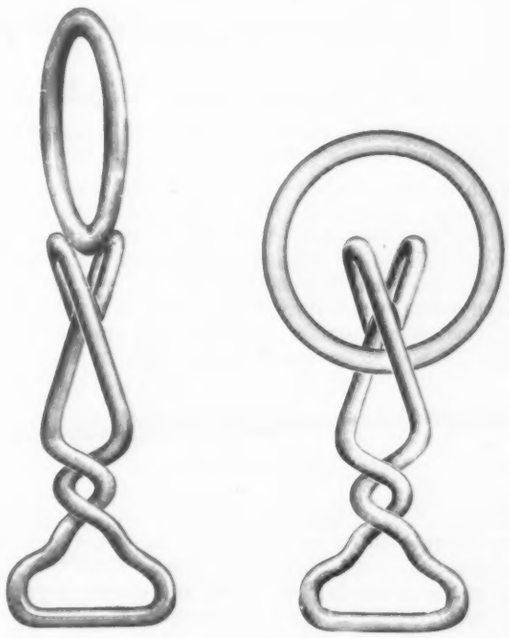


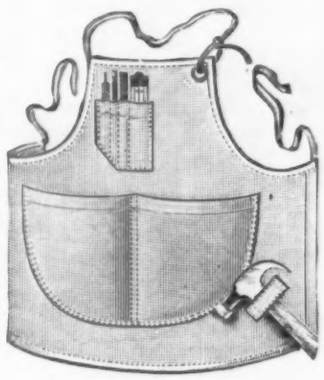
Fig. 1.—Safety Snap in Position to Attach.

Fig. 2.—Safety Snap in Position to Release.

To attach the snap the ends are placed on the ring as shown in Fig. 1 and the snap pushed on. To release the snap it is pushed on the ring past the beveled ends, as shown in Fig. 2, and then twisted to the right. The manufacturer states that the device is especially adapted for use in the fall and winter season, as it will not freeze up and may be easily operated with gloves or mittens on. It is now offered in ⅝, ¾, ⅞, 1, 1⅛ and 1½ in. sizes, and 1¼ in. will soon be added to the line.

Mechanics' Apron.

Specialty Mfg. Company, St. Anthony Park, Minn., is offering the mechanics' apron shown in the accompanying illustration. It is of heavy canvas, well sewed with extra



Mechanics' Apron.

strong thread and durable. Two large pockets are provided for nails as well as special pockets for rule, pencils and nail set. The apron also has a strap for carrying a hammer.

Yankee Spiral Ratchet Screw Driver No. 35.

North Bros. Mfg. Company, Philadelphia, manufacturer of Yankee tools, has added to its line the spiral ratchet screw driver No. 35, here shown. In construction it is the same as the company's Nos. 30 and 31,

Fig. 1.—Yankee Spiral Ratchet Screw Driver No. 35.

with which the trade is familiar. It drives screws in or out, ratchets in or out, and is arranged to hold rigid when closed or extended. The bits are straight, so that they can be used to drive screws through holes in insulators, &c., where the flattened blades will not pass through holes. The feature of the new tool is its size, it being smaller and lighter than the numbers previously made, this one measuring 7 in. in length when closed,

Fig. 2.—Chuck with Drill Point.

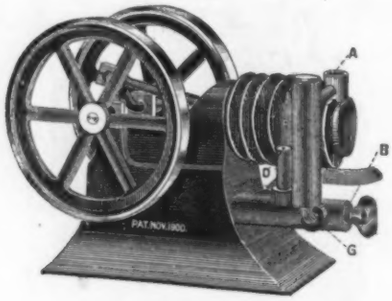
without bit, and weighing complete less than 7 oz. Its entire length with bit in chuck is 9⅛ in. closed and 12½ in. when extended. Extra long screw driver bits, the same width as regular bits but 2 in. longer, projecting 4 in. beyond the chuck, can be furnished. Three drill points are offered, 1-16, 5-64 and 3-32 in. sizes, which are attached as shown in Fig. 2. Larger drill points than these should not be used with this tool. The

Fig. 3.—Countersink.

countersink which can be furnished is shown in Fig. 3. The company explains that the tool is intended for electrical workers, cabinet makers, carpenters and mechanics having a large number of small screws to drive, where a lighter weight tool will be more sensitive and convenient than the standard pattern, No. 30.

The Paradox Gas Engine.

The gas engine shown in the illustration is designed as a toy and for use in window exhibits or for other similar uses where motion is desired to attract attention. The machine has recently been considerably improved to

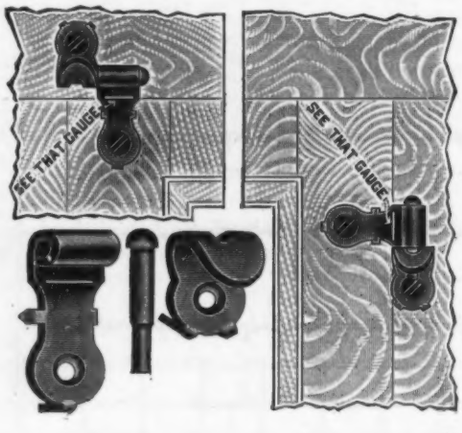


Paradox Gas Engine.

increase its efficiency, one important new feature being the grooving of the cylinder to give additional radiating surface. Referring to the illustration, A is the exhaust, B the gas inlet, C the air inlet, D the hole in burner and E a pin hole in cylinder. The burner acts as a torch and ignites each successive charge of gas behind the piston. A rubber tube connects with the gas inlet tube at the rear of the machine, and the tube is connected to an ordinary gas burner. In operating the machine the gas is turned on full at the fixture and the torch is lighted at D, sending up a slender flame which passes directly in front of the hole E in the cylinder. The thumbscrew regulates the amount of gas admitted, and it is turned until the gas ignites at C and A. A sharp turn of the flywheels causes the engine to start, the flames at A and C going out at the same time, admitting the necessary amount of air and permitting the exhaust. After the cylinder becomes hot the engine runs much faster, more gas being admitted for the purpose until the maximum speed is obtained, which is 700 rev. per min. Powdered graphite is used in lubricating the cylinder. The engine is 6 in. long by 3 in. wide and is furnished with several toy machnes which it will operate, one of the flywheels being supplied with a grooved pulley to take a belt. It is manufactured by the Paradox Gas Engine Company, Hartford, Conn.

Watrous Combination Storm Sash Hanger and Screen Hinge.

The E. L. Watrous Mfg. Company, maker of stamped steel hardware, Des Moines, Iowa, is placing on the market a new storm sash hanger and screen hinge. In bringing out this device the company has sought to effect a saving in labor. There are only four screws to set, and the carpenter while on the ground or even at his shop can plan where he wants the hinges, drive in the hinge pins and place the pin carrying section on the sash. The



Watrous Combination Storm Sash Hanger and Screen Hinge.

gauge shows just where the edge of the wood ought to come. The points are pressed in with the thumb, the hammer drives them home and the setting of one screw finishes the job. From a ladder the screen is set in the window, the hook slips under the pin and one blow of the hammer drives the points home. Both hands are then left free to set in the single screw. The device is tested for a strength up to 300 lb., and all parts are japanned, even the screws. The hinge can be used on cupboard doors, barn windows or any place where it is convenient to have an easily removable sash.

Byron Jackson has sold his interest in the firm of Jackson Bros. & Gillespie, Jonesboro, Ind., to Cornelius Clemits. The business will be continued under the same name.

The Clark Carriage Heaters.

Chicago Flexible Shaft Company, La Salle avenue and Ontario street, Chicago, Ill., is offering the carriage heaters, shown herewith. The fuel is in the form of carbon briquettes, 7½ x 2 x 1¼ in. in size, the volume of heat

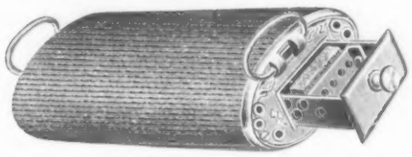


Fig. 1.—The Clark Oval Carriage Heater.

radiated being regulated by means of adjustable ventilators. The heaters are made of metal, securely riveted throughout, with an inner packing of asbestos to render them nonscorchable to anything with which they may come in contact. The heaters are covered with carpet or not, as desired. The heat chamber is made so that radiation may be upward and outward. A single briquette of coal, it is explained, will furnish a good, reliable, comforting heat from 12 to 16 hr. For the average ride of from 3 to 5 hr. a third of a briquette is ample. The

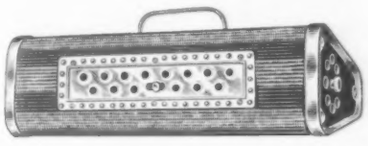


Fig. 2.—The Clark Triangular Carriage Heater.

heaters are so formed that the feet rest on them in a natural and easy manner, and there are two shapes, allowing customers a choice.

M. J. Shelvin, whose Hardware and Plumbing business was formerly located at 7 De Kalb avenue, Brooklyn, has recently occupied a new store at 613-615 Fulton street, near the corner of Flatbush avenue, which is being handsomely fitted up.

PAINTS, OILS AND COLORS

Animal, Fish and Vegetable Oils—

	₱ gal
Linseed, City, raw	40 @41
City, Boiled	41 @42
State and Western, raw	39 @40
Raw Calcutta, in bbls.	@..
Lard, Extra Prime, Winter	76 @77
Extra No. 1	50 @52
No. 1	45 @49
Cotton-seed, Crude f.o.b. mills	29 @32
Summer Yellow, Prime	42 @..
Summer Yellow, off grades	@..
Sperm, Crude	52 @53
Natural Spring	@..
Bleached Spring	@..
Natural Winter	65 @66
Bleached Winter	68 @69
Bleached Winter, Extra	70 @72
Tallow, Prime	56 @57
Whale, Crude	32 @33
Natural Winter	43 @44
Bleached Winter	45 @46
Extra Bleached Winter	47 @48
Menhaden, Brown, Strained	30 @31
Light Strained	30 @31
Bleached, Winter	@..
Extra Bleached, Winter	@..
Southern	25 @..
Cocoanut, Ceylon	₱ lb 8½@..
Cochin	₱ lb 9¼@ 9⅝
Cod, Domestic, Prime	30 @33
Newfoundland	35 @37
Red, Elaine	48 @51
Saponified	₱ lb 6½@ 7
Olive, Italian, bbls.	59 @65
Neatsfoot, Prime	49 @50
Palm, Lagos	₱ lb 7 @ 7¼

Mineral Oils—

Black, 29 gravity, 25@30 cold test	₱ gal. 10½@11½
29 gravity, 15 cold test	11½@12½
Summer	10½@11½
Cylinder, light filtered	18 @19
Dark filtered	16 @17
Paraffine, 903-907 gravity	13½@14
903 gravity	12½@13
883 gravity	10½@10¾
Red	12½@14

Miscellaneous—

Barytes:	
White, Foreign	₱ ton $18.50@20.00
Amer. floated	₱ ton 19.00@.....
Off color	₱ ton 11.50@15.50
Chalk, in bulk	₱ ton 3.00@ 3.25
In bbls.	₱ 100 lb ....@ .35
China Clay, English	₱ ton 11.00@17.00
Cobalt, Oxide	₱ 100 lb 2.50@ 2.60
Whiting, Commercial	₱ 100 lb .43@ .48
Gilders	₱ 100 lb .50@ .55
Ex. Gilders	₱ 100 lb .55@ .60

Putty, Commercial—₱ 100 lb

In bladders	$1.70 @1.85
In bbls. or tubs	1.20 @1.40
In 1 lb to 5 lb cans	2.65 @2.95
In 12½ to 50 lb cans	1.50 @1.90

Spirits Turpentine—₱ gal.

In Oil bbls.	69¼@69¾
In machine bbls.	69¾@70¼

Glue—

	₱ lb
Cabinet	11 @15
Common Bone	7 @ 9
Extra White	18 @24
Foot Stock, White	11 @14
Foot Stock, Brown	8 @11
German Hide	12 @18
French	10 @40
Irish	13 @16
Low Grade	9 @12
Medium White	14 @17

Gum Shellac—

	₱ lb
Bleached Commercial	47 @48
Bones, Dried	57 @59
Button	40 @50
Diamond L	53 @55
Fine Orange	50 @52
A. C. Garnet	49 @..
Kala Button	37 @38
G. A. L. Garnet	45 @45½
D. C	55 @58
Octagon B	@53½
T. N	48 @49
V. S. O	54 @55

Colors in Oil—

	₱ lb
Black, Lampblack	12 @14
Blue, Chinese	36 @46
Blue, Prussian	32 @36
Blue, Ultramarine	13 @16
Brown, Vandyke	11 @14
Green, Chrome	12 @16
Green, Paris	@21
Sienna, Raw	12 @15
Sienna, Burnt	12 @15
Umber, Raw	11 @14
Umber, Burnt	11 @14

White Lead, Zinc, &c.—

	₱ lb
Lead, English white, in Oil	9¾@10
Lead, American white, in Oil:	
Lots of 500 lb or over	@ 7¼
Lots less than 500 lb	@ 7¾
In Barrels	@ 6¾
Lead, White, in oil, 25 lb tin pails, add to keg price	@ ⅛
Lead, White, in oil, 12½ lb tin pails, add to keg price	@ 1
Lead, White, in oil, 1 to 5 lb assorted tins, add to keg price	@ 1¼

Lead, American, Terms: For lots 12 tons and over ¼¢ rebate; and 2% for cash if paid in 15 days from date of invoice; for lots of 500 lbs. and over 2% for cash if paid in 15 days from date of invoice, for lots of less than 500 lbs. net.

	₱ lb
Lead, White, Dry, in bbls.	6½@ 6¾
Zinc, American, dry	5⅝@ 5⅞

Zinc, French:

Antwerp, Red Seal, dry	8¾
Antwerp, Green Seal, dry	10¾
Paris, Red Seal, dry	9¾
Paris, Green Seal, dry	11

Zinc, V. M. French, in Poppy Oil:
Green Seal:
Lots of 1 ton and over 13¼@13⅝
Lots of less than 1 ton 13⅝@13⅞
Zinc, V. M. French, in Poppy Oil:
Red Seal:
Lots of 1 ton and over 11⅞@12⅜
Lots of less than 1 ton 12⅛@12⅝
Discounts.—French Zinc.—Discounts to buyers of 10 bbl. lots of one or mixed grades, 1%; 25 bbls., 2%; 50 bbls., 4%.

Dry Colors—

	₱ lb
Black, Carbon	5 @10
Black Drop, American	4 @ 6
Black Drop, English	5 @15
Black, Ivory	16 @20
Lamp, Com	4½@ 6
Blue, Celestial	4 @ 6
Blue, Chinese	29 @32
Blue, Prussian	27 @30
Blue, Ultramarine	4½@15
Brown, Spanish	½@ 1
Carmine, No. 40	$3.00@3.05
Green, Chrome, ordinary	3½@ 4
Green, Chrome, pure	17 @25

Lead, Red (bbls., ½ bbls. and kegs):

Lots 500 lb or over	@ 7¼
Lots less than 500 lb	@ 7¾
Litharge, American, bbls.	7¼@ 7¾
Ocher, American	₱ ton $8.50@16.00
American Golden	2½@ 3½
French	1¼@ 2½
Foreign Golden	3 @ 4
Orange Mineral, English	10 @12
French	10¾@12
German	8½@10
American	8½@ 8¾
Red, Indian, English	4½@ 8½
American	3 @ 3¼
Red, Turkey, English	4 @10
Red, Tuscan, English	7 @10
Red, Venetian, Amer.	₱ 100 lb $0.50@1.25
English	100 lb $1.15@1.75
Sienna, Italian, Burnt and Powdered	3 @ 9½
Italian, Raw, Powdered	3 @ 6½
American, Raw	1½@ 2
American Burnt and Pow.	1½@ 2
Talc, French	₱ ton $17.00@25.00
American	₱ ton 17.00@25.00
Terra Alba, French	₱ 100 lb .90@ 1.00
English	₱ 100 lb .80@ 1.00
American	₱ 100 lb, No. 1 .75@ .80
American	₱ 100 lb, No. 2, .60@ .65
Umber, Turkey, Bnt. & Pow.	2½@ 3½
Turkey, Raw and Powdered	2½@ 3½
Burnt, American	1½@ 2
Raw, American	1½@ 2
Yellow, Chrome	12 @14
Vermilion, American Lead	10 @..
Quicksilver, bulk	6¾ @..
Quicksilver, bags	@..
English, Imported	6¾ @70
Chinese	$1.00@1.00

THE IRON AGE

The oldest paper in the world devoted to the interests of the Hardware, Iron, Machinery and Metal Trades, and a standard authority on all matters relating to those branches of industry.

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Current Hardware Prices.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer—are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33⅓ @ 33⅓ & 10% signifies that the price of the goods in question ranges from 33⅓ per cent. discount to 33⅓ and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued May, 1906, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—
Domestic, ₱ doz. $3.00.....33⅓%
North s 10%
Zimmerman's—See Fasteners, Blind.

Window Stop—
Ives' Patent.....35%
Taplin's Perfection.....35%

Ammunition— See *Caps, Cartridges, Shells, &c.*

Anti-Rattlers—
Fernald Mfg. Co. Burton Anti-Rattlers, ₱ doz. pairs, Nos. 1, 2, 3; 2, $0.60; 4, $1.00; 5, $0.50.
Fernald Quick Shifter, ₱ doz. pairs .....$2.00@$3.00

Anvils—American—
Eagle Anvils.....₱ lb 7 @7¼¢
Hay-Budden, Wrought.....9½@9¾¢
Trenton .....₱ lb 9½@9¾¢

Imported—
Peter Wright & Sons, ₱ lb, 84 to 349 lb, 11¢; 350 to 600 lb, 11½¢.

Anvil, Vise and Drill—
Millers Falls Co., $18.00.....15&10%

Apple Parers— See *Parers, Apple, &c.*

Aprons, Blacksmiths'—
Livingston Nail Co.....33⅓%

Augers and Bits—
Com. Double Spur.....75@75&10%
Jennings' Pats., reg. finish.....50&10@60%
Black Lip or Blued.....60&10%
Boring Mach. Augers.....70&10%
Car Bits, 12-in. twist.....50&10%
Ford's Auger and Car Bits.....40&5%
Ft. Washington Auger Co., Conrad's 35%
Forstner Pat. Auger Bits.....25%
C. E. Jennings & Co.:
No. 10 ext. lip, R. Jenningas' list..25%
No. 30, R. Jennings' list.....40&7½%
Russell Jennings'.....25&10&2½%
L'Hommedieu Car Bits.....15%
Mayhew's Countersink Bits.....45%
Pugh's Black.....20%
Pugh's Jennings' Pattern.....35%
Snell's Auger Bits.....60%
Snell's Bell Hangers' Bits.....60%
Snell's Car Bits, 12-in. twist.....60%
Snell's King Auger Bits.....60%
Wright's Jennings' Bits.....50%

Bit Stock Drills—
See *Drills, Twist.*

Expansive Bits—
Clark's small, $18; large, $28.....50&10%
Clark's Pattern, No. 1, ₱ doz. $36; No. 2, $18.....60&10&10%
Ford's, Clark's Pattern.....60%
C. E. Jennings & Co., Steer's Pat..25%
Lavigne Pat., small size, $18.00; large size, $26.00.....70&10%
Swan's 60%

Gimlet Bits—
Per gro.
Common Dble. Cut....$3.00@3.25
German Pattern, Nos. 1 to 10, $4.75; 11 to 13, $5.75

Hollow Augers—
Bonney Pat., per doz..$5.50@6.00
Ames .....25&10%
Universal 20%
Wood's Universal 25%

Ship Augers and Bits—
Ship Augers.....45&5&—%
Ford's .....33⅓&5%
C. E. Jennings & Co.:
L'Hommedieu's 15%
Watrous' .....33⅓&7½%
Snell's 40%

Awl Hafts— See *Handles, Mechanics' Tool.*

Awls—
Brad Awls:
Handled .....gro. $2.75@3.00
Unhdled, Shldered...gro.63¢@66¢
Unhandled, Patent..gro.66¢@70¢
Peg Awls:
Unhandled, Patent..gro. 31@34¢
Unhdled, Shldered..gro. 65@70¢
Scratch Awls:
Handled, Com...gro. $3.50@4.00
Handled, Socket..gro.$11.50@12.00

Awl and Tool Sets— See *Sets, Awl and Tool.*

Axes—
Single Bit, base weights: Per doz.
First Quality.....$4.75@5.00
Second Quality.....$3.25@4.50
Double Bit, base weights:
First Quality.....$7.00@7.50
Second Quality.....$6.50@6.75

Axle Grease—
See *Grease, Axle*

Axles— *Iron or Steel*
Concord, Loose Collar...4½@4¾¢
Concord, Solid Collar...4¾@5¼¢
No. 1 Common, Loose...3¾@3¾¢
No. 1½ Com., New Style3¾@4¼¢
No. 2 Solid Collar.....4@4½¢
Half Patent:
Nos. 7, 8, 11 and 12....75@75&5%
Nos. 13 to 14.....70&10@75&5%
Nos. 15 to 18...75&10@75&10&5%
Nos. 19 to 22...75&10@75&10&5%

Boxes, Axle—
Common and Concord, not turned lb., 4½@5¢
Common and Concord, turned. lb., 5½@6¢
Half Patent.....lb., 9½@10¢

Bait— Fishing—
Hendryx:
A Bait.....30%
B Bait.....25%
Competitor Bait.....20&5%

Balances— Sash—
Caldwell new list.....50%
Pullman .....50&10@60%

Spring—
Spring Balances.....50&10@60%
Chatillon's:
Light Spg. Balances.....50&10%
Straight Balances.....40@50%
Circular Balances.....50&10%
Large Dial.....30%

Barb Wire—See *Wire, Barb.*

Bars— Crow—
Steel Crowbars, 10 to 40 lb.... per lb., 3@3½¢

Towel
No. 10 Ideal, Nickel Plate..₱ gro. $8.50

Beams, Scale—
Scale Beams.....40&5@40&10%
Chattillon's No. 1.....30%
Chattillon's No. 2.....40%

Beaters, Carpet—
Holt-Lyon Co.:
No. 13 Wire Tinned ₱ doz.....$0.75
No. 12 Wire Coppered ₱ doz, $0.75; Tinned $0.85
No. 11 Wire Coppered ₱ doz. $1.10; Tinned $1.20
No. 10 Wire Galvanized..₱ doz. $1.50
Western W. G. Co.:
No. 1 Electric.....₱ gro. $7.80
No. 2 Buffalo.....₱ gro. $9.00
No. 3 Perfection Dust.....₱ gro. $8.00

Egg—
Holt-Lyon Co.:
Holt, per doz., No. 5, $0.80; No. 1, Jap'd, $1.15; No. 1, Tin'd, $1.40; No. B, Jap'd, $1.85; No. 2, Tin'd, $2.25; No. 6, $1.60.
Lyon, Jap'd, per doz., No. 2, $1.35.
Taplin Mfg. Co.:
Improved Dover, per gro., No. 60, $6.00; No. 75, $6.50; No. 100, $7.00; No. 102, Tin'd, $8.50; No. 150, Hotel, $15.00; No. 152, Hotel Tin'd, $17.00; No. 200, Tumbler, $8.50; No. 202, Tumbler Tin'd, $9.50; No. 300, Mammoth, per doz., $25.00.
Turner & Seymour Mfg. Co.:
T. & S. Dover.....$6.00
Western, W. G. Co., ₱ gro., Buffalo, No. 2, $8.00; Perfection, No. 3, $9.00.
Wonder (R. M. Co.)..₱ gro. net, $6.25

Bellows—
Blacksmith, Standard List..
Split Leather.....65%
Grain Leather.....60%

Hand—
Inch..	*6*	*7*	*8*	*9*	*10*
Doz...	*$5.50*	*6.15*	*6.60*	*7.15*	*7.70*

Molders—
Inch..	*9*	*10*	*11*	*12*	*14*
Doz...	*$8.00*	*9.00*	*10.50*	*12.50*	*14.50*

Net Prices.

Bells— Cow—
Ordinary Goods...75&5@75&10&5%
High grade.....70&10@75%
Jersey .....75&10%
Texas Star.....50%

Door—
Abbe's Gong.....45%
Barton Gong.....50%
Home, R. & E. Mfg. Co.'s.....55&10%
Trip Gong.....50&10@50&10&5%
Yankee Gong.....55%

Hand—
Polished, Brass.....60&10%
White Metal.....60%
Nickel Plated.....50&10@60%
Swiss .....50&10@50&10&5%
Cone's Globe Hand Bells.....33⅓@33⅓%
Silver Chime.....33⅓@35%

Miscellaneous—
Farm Bells.....lb., 2¼@2½¢
Church and School.....60%
American Tube & Stamping Co. Gongs 70%
Table Call Bells.....50@50&10%

Belting— Leather—
Extra Heavy, Short Lap..60&5%
Regular Short Lap....60&10&5%
Standard 70%
Light Standard.....70&5%
Cut Leather Lacing.....45%
Leather Lacing Sides, per sq. ft. 25¢

Rubber—
Agricultural (Low Grade).... 75@75&5%
Common Standard....70@70&10%
Standard .....60&5@60&10%
Extra .....60@60&5%
High Grade.....50&5@50&10%

Bench Stops—
See *Stops, Bench*

Benders and Upsetters, Tire—
Detroit Perfected Tire Bender.....40%
Detroit Stoddard's Lightning Tire Upsetters, No. 1, $4.25; No. 2, $7.25; No. 3, $10.50; No. 4, $16.25; No. 5, $20.50.
Green River Tire Benders and Upsetters 20%

Bicycle Goods—
John S. Leng's Son & Co.'s 1906 list: Chain, Parts, Spokes.....50%
Tubes 60%

Bits—
Auger, Gimlet, Bit Stock Drills, &c.—See *Augers and Bits.*

Blocks— Tackle—
Common Wooden.....75%
Hartz St. Tackle Blocks.....50@50&5%
B. & L. R. Co.:
Boston Wood Snatch, 50%; Eclipse Steel, 75%; Hollow Steel, 50&10%; Star Wire Rope, 50%; Tarbox Metal Snatch, 50%; Tarbox New Style Steel, 50&10%; Wire Rope Snatch, 50%.
Lane's Patent Automatic Lock and Junior 30%
Stowell's Novelty, Mal. Iron.....50%
Stowell's Loading.....50&10%
See also Machines, Hoisting.

Boards, Stove—
Zinc, Crystal, &c.....40%
Paper Embossed.....40&10%

Boards, Wash—
See *Washboards.*

Bobs, Plumb—
Peuffel & Esser Co.....33⅓%

Bolts—

Carriage, Machine, &c.—
Common Carriage (cut thread): ⅜ × 6 and smaller.....75@—%
Larger and Longer..... 60&10@60&10&5%
Phila. Eagle $3.00 list May 24, '99 40%
Bolt Ends.....65@65&5%
Machine, ⅜ x 4 and smaller.. 75@—%
Machine, larger and longer.. 65@65&5%

Door and Shutter—
Cast Iron Barrel, Japanned, Round Brass Knob:
Inch.....	*3*	*4*	*5*	*6*	*8*
Per doz.	*$1.30*	*.35*	*.45*	*.60*	*.80*

Cast Iron Spring Foot, Jap'd:
Inch.....	*6*	*8*	*10*
Per doz.....	*$1.20*	*1.50*	*2.25*

Cast Iron Chain, Flat, Japanned:
Inch.....	*6*	*8*	*10*
Per doz.....	*$1.00*	*1.40*	*1.85*

Cast Iron Flat Shutter, Jap'd., Brass Knobs:
Inch.....	*6*	*8*	*10*
Per doz.....	*$0.75*	*.95*	*1.25*

Wrought Barrel Japd..80@80&10%
Barrel Bronzed.....60&10%
Spring .....70&10@70&10&10%
Shutter .....50&5@50&10&5%
Square Neck.....75@75&10%
Square .....70&10@70&10%
Ives' Patent Door.....50%

Plow and Stove—
Plow .....60&10@—
Stove .....82½&10

Tire—
Common Iron.....80%
Norway Iron.....80%
American Screw Company:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84....82½%
Bay State, list Dec. 28, '99.....80%
Franklin Moore Co.:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84....82½%
Eclipse, list Dec. 28, '99.....80%
Mount Carmel Bolt Co.:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84....82½%
Mount Carmel, list Dec. 28, '99...80%
Russell, Burdsall & Ward Bolt & Nut Co.:
Empire, list Dec. 28, '99.....80%
Norway Phila., list Oct., '84.....80%
Upson Nut Co.:
Tire Bolts.....72½%

Borers, Tap—
Borers Tap, Ring, with Handle:
Inch.....	*1¼*	*1½*	*1¾*	*2*
Per doz...	*$4.80*	*5.60*	*6.40*	*8.00*
Inch	*2¼*		*2½*	
Per doz.....	*$8.65*		*11.50*	

Enterprise Mfg. Co., No. 1, $1.25; No. 2, $1.75; No. 3, $2.50 each.....25%

Boxes, Mitre—
C. E. Jennings & Co.....30%
Langdon, New Langdon and Langdon Improved, 20&10%; Langdon Acme .....15&10%
Perfection 40%
Seavey 40%
Stanley R. & L. Co.: Nos. 240 to 460, 30%; Nos. 50 and 60.....35%

Braces—
Common Ball, American..$1.25@1.80
Barber's .....50&10&10@60&10%
Fray's Genuine Spofford's.....60%
Fray's No. 70 to 120, 81 to 123, 207 to 411 .....60%
C. E. Jennings & Co.....50&5%
Mayhew's Ratchet.....60%
Mayhew's Quick Action Hay Pat...50%
Millers Falls Drill Braces.....25&10%
P., S. & W. Co., Peck's Pat.60@60&5%
Stanley R. & L. Co.:
Stanley, 35%; Victor.....45%

Brackets—
Wrought Steel.....80@80&5%
Griffin's Pressed Steel.....75&10@80%
Griffin's Folding Brackets.....70&10%
Stowell's Cast Shelf, 75%; Sink...50%
Western, W. G. Co., Wire.....60&10%

Bright Wire Goods—
See *Wire and Wire Goods.*

Broilers—
Kilbourne Mfg. Co.....75&20%
Western, W. G. Co.....80%
Wire Goods Co.....75@75&10%

Buckets, Galvanized—
Price per dozen.
Quart.....	*10*	*12*	*14*
Water, Regular...	*1.40*	*1.70*	*1.90*
Water, Heavy....	*3.40*	*3.70*	*3.80*
Fire, Rd. Bottom..	*2.30*	*2.55*	*2.95*
Well	*2.55*	*2.87*	*3.15*

Bucks, Saw—
Hoosier.....₱ gro. $36.00

Bull Rings— See *Rings, Bull*

Butts— Brass—
Wrought 50%
Cast Brass, Tiebout.....50%

Cast Iron—
Fast Joint, Broad....40&10@50%
Fast Joint, Narrow...40&10@50%
Loose Joint.....70&10@75%
Loose Pin.....70&10@75%
Mayer's Hinges.....70@70&5
Parliament Butts.....70@70&5

Wrought Steel—
Discount.
Reversible and Broad..75&5%
Light Reversible, Light Narrow .....75&10%
Loose Joint, Narrow, L'ht Inside Blind, etc....75%
Back Flaps, Table, Chest. .....70&10%

Extra, @40%

Cages, Bird—
Hendryx Brass: Series 3000, 5000, 1100, 10%; 1200, 25%; 200, 300, 600, 900 .....40%
Hendryx Bronze: Series 700, 800, 10%
Hendryx Enameled 40%

Calipers—See *Compasses.*

Calks, Toe and Heel—

Blunt, 1 prong.....per lb., 4@4¼¢
Sharp, 1 prong...per lb., 4½@4¾¢
Burke's Blunt, 4@4¼¢; Sharp, 4½@4¾¢
Gautier, Blunt, 4@4¼¢; Sharp, 4½@4¾¢
Perkins', Blunt, ℔ lb, 3.65¢; Sharp, 4.15¢

Can Openers—
See *Openers, Can.*

Cans, Milk—

	5	8	10 gal.
Illinois Pattern	$1.35	1.85	2.05 each.
New York Pattern	1.50	2.20	2.45 each.
Baltimore Pattern	1.50	2.20	2.45 each.
Dubuque	1.35	1.60	1.75 each.

Cans, Oil—

Buffalo Family Oil Cans:		
3	5	10 gal.
$18.00	60.00	129.60 gro., net.

Caps, Percussion—

Eley's E. B.....58@55¢
G. D.....per M 34@35¢
F. L.....per M 40@42¢
G. E.....per M 48@50¢
Musket.....per M 62@63¢

Primers—

Berdan Primers, $2 per M...20%
B. L. Caps (Sturtevant Shells) $2 per M.....20%
All other primers per M.$1.52@1.60

Cartridges—

Blank Cartridges:
32 C. F., $5.50.....10&5%
38 C. F., $7.00.....10&5%
22 cal. Rim, $1.50.....10&5%
32 cal. Rim, $2.75.....10&5%
B. B. Caps, Con. Ball, Swgd. $1.90
B. B. Caps, Round Ball....$1.40
Central Fire.....25%
Target and Sporting Rifle..15&5%
Primed Shells and Bullets.15&10%
Rim Fire, Sporting.....50%
Rim Fire, Military.....15&5%

Casters—

Bed.....70@70&10%
Plate.....60&10@60&10&5%
Philadelphia.....75@75&10%
Acme, Ball Bearing.....33⅓%
Boss.....70&10%
Boss Anti-Friction.....70&10%
Gem (Roller Bearing).....80%
Martin's Patent (Phoenix).....45%
Standard Ball Bearing.....45%
Tucker's Patent low list.....30%
Yale (Double Wheel) low list.....50%

Cattle Leaders—
See *Leaders, Cattle.*

Chain, Coil—

American Coil, Straight Link:

5-16	*¼*	*5-16*	*⅜*	*7-16*	*½*	*9-16*
$8.90	*6.10*	*5.10*	*4.50*	*4.25*	*4.15*	*4.10*

⅝ ¾ ⅞ to 1 1-16 1⅛ to 1¼ inch.
$4.00 3.90 3.85 3.95
German Coil.....60&10&10@70%

Halter—

Halter Chains.....60&5@60&10%
German Pattern Halter Chains, list July 2½, '97.....60&10&10%
Covert Mfg. Co.
Halter.....35&5%

Cow Ties—
See *Halters and Ties.*

Trace, Wagon, &c.—

Traces, Western Standard: 100 pr.
6½—6-3, Str'ght, with ring.$25.00
6½—6-2, Str'ght, with ring.$26.00
6½—8-2, Str'ght, with ring.$30.00
6½—10-2, Str'ght, with ring.$35.00
NOTE.—Add 2c per pair for Hooks. Twist Traces; add per pair for Nos. 2 and 3, 2c; No. 1, 3c; No. 0, 4c to price of Straight Link.
Eastern Standard Traces, Wagon Chain, &c.....60&10%

Miscellaneous—

Jack Chain, list July 10, '93:
Iron.....60&10%
Brass.....60&10%
Safety Chain.....70&10%
Gal. Pump Chain.....lb. 4@4½¢
Covert Mfg. Co.:
Breast, Halter, Heel, Rein, Stallion.....40%
Oneida Community:
Am. Dog Leads and Kennel Chains, 40@40&5%
Niagara Dog Leads and Kennel Chains.....45@60&5%
Wire Goods Co.:
Dog Chain.....70&10%
Universal Dbl.-Jointed Chain.....50%

Chain and Ribbon, Sash—

Oneida Community:
Copper Chain, 60&5%; Steel Chain, 60%
Pullman:
Bronze Chain, 60%; Steel Chain, 60&10%
Sash Chain Attachments, per set..8¢
Aluminoy Sash Ribbon, per 100 ft.....$1.25@$3.00
Sash Ribbon Attachments, per set.8¢

Chalk—(From Jobbers.)

Carpenters' Blue....gro., 45@55¢
Carpenters' Red.....gro., 40@50¢
Carpenters' White....gro., 35@45¢

Checks, Door—

Bardsley's.....45%
Pullman, per gro.....$54.00
Russwin.....33⅓%

Chests, Tool—

American Tool Chest Co.:
Boys' Chests, with Tools.....55%
Youths' Chests, with Tools.....40%
Gentlemen's Chests, with Tools..30%
Farmers', Carpenters,' etc., Chests, with Tools.....20%
Machinists' and Pipe Fitters' Chests, Empty.....50%
Tool Cabinets.....50%
C. E. Jennings & Co.'s Machinists' Tool Chests.....33⅓&10%

Chisels—

Socket Framing and Firmer

Standard List..75&10@75&10&5%
Buck Bros.....30%
Charles Buck Edge Tool Co.....30%
C. E. Jennings & Co.:
Socket Firmer No. 10.....60%
Socket Framing No. 15.....60%
Swan's.....75%
L. & I. J. White Co.....30@30&5%

Tanged—

Tanged Firmers.....33 1-3@40%
Buck Bros.....30%
Charles Buck Edge Tool Co.....30%
C. E. Jennings & Co. Nos. 191, 181..25%
L. & I. J. White Co.....25&5%

Cold—*lb.*

Cold Chisels, good quality..13@15¢
Cold Chisels, fair quality..11@12¢
Cold Chisels, ordinary...9@10¢

Chucks—

Almond Drill Chucks.....35%
Almond Turret Six-Tool Chuck.....35%
Beach Pat., each $8.00.....35&5%
Empire.....25%
Blacksmiths'.....25%
Jacobs' Drill Chucks.....35%
Pratt's Positive Drive.....25%
Skinner Patent Chucks:
Independent Lathe Chucks.....40%
Universal, Reversible Jaws.....40%
Combination, Reversible Jaws.....40%
Drill Chucks, New Model, 25%; Standard, 40&10%; Skinner Pat., 25%; Positive Drive.....40%
Planer Chucks.....30%
Face Plate Jaws.....40%
Standard Tool Co.:
Improved Drill Chuck.....45%
Union Mfg. Co.:
Combination, Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 17, 40%; No. 21.....35%
Scroll Combination, Nos. 82 and 84.....30%
Geared Scroll, Nos. 33, 34 and 35..35%
Independent Iron, Nos. 18 and 318.40%
Independent Steel, No. 64.....30%
Union Drill, Nos. 000, 00, 100, 101, 102, 103, 104.....35%
Union Czar Drill.....25%
Universal 11, 12, 16, 17, 13, 14, 15..40%
Universal, No. 42.....35%
Iron Face Plate Jaws, Nos. 28, 30, 48 and 50.....40%
Steel Face Plate Jaws, Nos. 70 and 72.....35%
Westcott Patent Chucks:
Lathe Chucks.....50%
Little Giant Auxiliary Drill.....50%
Little Giant Double Grip Drill..50%
Little Giant Drill, Improved.....50%
Oneida Drill.....50%
Scroll Combination Lathe.....50%

Clamps—

Adjustable, Hammers'.....20@20&5%
Carriage Makers', P., S. & W. Co.....40&10@50%
Besly, Parallel.....33⅓&10%
Lineman's, Utica Drop Forge & Tool Co.....40%
Wood Workers, Hammers'.....40&10%
Saw Clamps, see Vises, Saw Filers'.

Cleaners, Drain—

Iwan's Champion, Adjustable.....55%
Iwan's Champion, Stationary.....45%

Sidewalk—

Star Socket, All Steel..℔ doz. $4.05 net
Star Shank, All Steel..℔ doz. $3.24 net
W. & C. Shank, All Steel, ℔ doz., 7½ in., $3.00; 8 in., $3.25.

Cleavers, Butchers'—

Foster Bros.....30%
Fayette R. Plumb.....30%
L. & I. J. White Co.....30%

Clippers, Horse and Sheep—

Chicago Flexible Shaft Company:
'98 Chicago Horse, each....$8.75
1902 Chicago Horse, each..$10.75
20th Century Horse, each..$5.00
Lightning Belt Horse, each.$15.00
Chicago Belt Horse, each.$20.00
Stewart's Enclosed Gear Horse, each.....$8.75
Stewart's Patent Sheep Shearing Machine, each.....$12.75
} 20%

Clips, Axle—

Regular Styles, list July 1, '05.80%

Cloth and Netting, Wire—See *Wire, &c.*

Cocks, Brass—

Hardware list:
Plain Bibbs, Globe, Kerosene, Racking, Liquor, Bottling, &c.....70%
Compression Bibbs.....65&10%

Coffee Mills—

See *Mills, Coffee.*

Collars, Dog—

Nickel Chain, Walter B. Stevens & Son's list.....40%
Leather, Walter B. Stevens & Son's list.....40%

Combs, Curry—

Metal Stamping Co.....40%

Compasses, Dividers, &c.

Ordinary Goods.....70&10@75%
Bemis & Call Hdw. & Tool Co.:
Dividers.....65%
Calipers, Double, 65%; Inside or Outside.....65%
Calipers, Wing.....60%
Compasses.....50%
Wm. Schollhorn Co.:
Excelsior Dividers.....55%
Lodi Dividers.....75%

Conductor Pipe,—

L. C. L. to Dealers:

	Galvanized		
Galv. Steel.	*Charcoal Iron.*	*Copper. 14, 16&20 oz.*	
Eastern:			
60&30%	60&2½%	30&10&2½%	
Central:			
70%	55&7½%	30&10%	
Western and Southern:			
65&10%	55&2½%	30&7½%	
So. Western			
62½&7½%	50&5%	30&5%	

Terms, 60 days; 2% cash 10 days. Factory shipments generally delivered.
See also Eave Troughs.

Coolers, Water—

Gal. each..	2	3	4	6	8
Labrador ...	$1.20	$1.50	$1.80	$2.10	$2.70
Gal.....	3	4	6	8	
Iceland, ea..	$1.80	$2.10	$2.40	$3.00	
Gal.....	2	3	4	6	8
Galvanized, ea.	$1.85	$2.00	$2.25	$2.90	$3.90
Galvanized, Lined, side handles, Gal, ...	2	3	4	6	8
Each	$1.95	$2.15	$2.40	$3.30	$4.15

White Enameled, 25%; Agate Lined, 25%

Coopers' Tools—
See *Tools, Coopers'.*

Coppers' Soldering—

Soldering Coppers, 3 lbs. to pair and heavier, 23¢; lighter than 3 lb. to pair.....25¢

Cord—Sash—

Braided, Drab.....lb. 35¢
Braided, White, Com., Nos. 8 to 12, 24¢; No. 7, 24½¢; No. 6, 25½¢.
Cable Laid Italian..... lb., A, 18¢; B, 16¢
Common India.....lb. 10@10½¢
Cotton Sash Cord, Tw'ted. 17@19¢
Patent Russia.....lb..@14¢
Cable Laid Russia....lb..@15¢
India Hemp, Br'd'd..lb. 18@18½¢
India Hemp, Twisted..lb. 12@13¢
Patent India, Twisted.lb. 12@13¢
Anniston Cordage Co.: ℔ lb, solid Braided, Nos. 8 to 12, $0.24; No. 7, $0.24½; No. 6, $0.25½; ℔ doz., 50 ft., Oriole, $2.00; 50 ft., Columbia, $0.85; 50 ft., Victors, $1.00; 50 ft., 6-Thread, $1.10; 60 ft., 3-Thread, $0.95; 50 ft., Manila, $1.40; 60 ft., Jute, $0.75.
Pearl Braided, cotton, No. 6, ℔ lb, 25½¢; No. 7, 25¢; Nos. 8 to 12, 24½¢
Eddystone Braided, Nos. 8 to 10, 25¢; 7, 25½¢; 6, 26½¢.
Harmony Cable Laid Italian, Nos. 7 to 10.....℔ lb 25 ¢
Pullman:
Wire Sash Cord.....10%
Sash Cord Attachments, per doz.10¢
Samson, Nos. 8 to 12:
Braided, ℔ lb., Drab Cotton, 55¢; Italian Hemp, 40¢@50¢; Linen, 65¢; White Cotton, 50¢; Spot Cord.....50¢
Massachusetts, White....℔ lb 40¢
Massachusetts, Drab.....℔ lb 45¢
No. 7, 28¢; No. 6, 30¢.
} 15&10%
Phoenix, White, Nos. 8 to 12, 27¢;
Silver Lake, per lb.:
A, Drab, 45¢; A, White, 40¢; B, Drab, 40¢; B, White, 35¢; Italian Hemp, 40¢; Linen....57½¢
See also Chain and Ribbon.

Wire, Picture—

List July 10, 1906...85¢10&10@—
Hendryx Standard Wire Picture Cord, old list, 85&10%

Cradles—

Grain.....40&12½%

Crayons—

White Round Crayons, Cases, 100 gro., $6.50@$7.50 at factory, but lower prices made by jobbers
Zelnicker's Lumber. ℔ gro.
White and Purple, Indelible....$7.50
Blue, Red, Green, Yellow and Terra Cotta, $6.50; Black.....$4.00
Genuine Soapstone, Metal Workers', 5 in. x ¼ in. Round, $2.50; 5 in. x ¼ in. Square, $1.75; 5 x ½ x 3-16, $2.50; 5 x 1¼ x 3-16.....$3.00

Crooks, Shepherds'—

Fort Madison, per doz., Heavy, $7.00; Light.....$6.50

Crow Bars—See *Bars, Crow.*

Cultivators—

Victor Garden.....50%

Cutlery, Table—

International Silver Company:
No. 12 M'd'm Knives, 1847, ℔ doz. $3.50
Star, Eagle, Rogers & Hamilton and Anchor.....℔ doz. $3.00
Wm. Rogers & Son.....℔ doz. $2.50

Cutters—Glass—

H. H. Mayhew Co.....40%
Red Devil.....50%
Smith & Hemenway Co.....50%
Woodward.....40%

Meat and Food—

American.....30%

Nos.	1	2	3	4	B	5
Each	$5	$7	$10	$25	$50	$60

Enterprise:

Nos.	5	10	12	22	32	
Each	$2	$3	$2.75	$4.50	$6	25@25&7½%
No. 202,	$1.50					40&7½%

Dixon's.....℔ doz. 30@30&5%

Nos.	1	2	3	4
	$14.00	$17.00	$19.00	$30.00

Ideal.....40@40&5%
Little Giant.....℔ doz. 40@50%

Nos.	305	310	312	320	322
	$35.00	$48.00	$44.00	$72.00	$68.00

N. E. Food Choppers.....25%
New Triumph No. 605, ℔ doz. $24.00.....40@50%
Russwin Food, No. 1, $24.00; No. 2, $27.00.....45&10&10%
Woodruff's.....℔ doz. 30@30&5%

Nos.	100	150
	$15.00	$18.00

Enterprise Beef Shavers.....25@30%

Slaw and Kraut—

Henry Disston & Sons:
Slaw and Kraut Cutters, Corn Graters, &c.....35%
J. M. Mast Mfg. Co.:
Slaw Cutters, 1 Knife....℔ doz. $3.00
Combined Slaw Cutter and Corn Grater.....℔ doz. $4.00
Tucker & Dorsey Mfg. Co.:
Kraut Cutters.....40%
Slaw Cutters, 1 Knife..℔ gr. $18@$20
Slaw Cutters, 2 Knife..℔ gr. $22@$30

Tobacco—

All Iron, Cheap..doz. $4.25@$4.50
Enterprise.....25@30%
National, ℔ doz., No. 1, $21; No. 2, $18.....40%

Diggers, Post Hole, &c.—

Disston's:
Rapid, ℔ doz., $24.00.....25%
Samson, ℔ doz., $34.00.....25%
Iwan's Imp'ved Post Hole Auger.40&5%
Vaughan Pattern Post Hole Augers, ℔ doz., $6.25
Perfection Post Hole Diggers, ℔ doz.....$8.25
Split Handle Post Hole Diggers, ℔ doz. $7.25
Kohler's, ℔ doz., Universal, $14.00; Little Giant, $12.00; Hercules, $10.00; Invincible, $9.00; Rival, $8.00; Pioneer.....$7.00
Never-Break Post Hole Diggers, ℔ doz., $24.00.....50%

Dividers—See *Compasses.*

Drawers, Money—

Tucker's Pat. Alarm Till No. 1, ℔ doz., $18; No. 2, $15; No. 3, $12; No. 4, $18.

Drawing Knives—
See *Knives, Drawing.*

Dressers, Emery Wheel—

Diamond Emery Wheel Dressers....35%
Diamond Wheel Dresser Cutters....35%

Drills and Drill Stocks—

Blacksmiths' Common Drilling Machines.....$1.50@$1.75
Breast, Millers Falls.....10&10%
Breast, P., S. & W.....40%
Goodell Automatic Drills..40&5@40&10%
Johnson's Automatic Drills, Nos. 2 and 3.....16⅔%
Johnson's Drill Points.....16⅔%
Millers Falls Automatic Drills.33⅓&10%
Ratchet, Curtis & Curtis.....25%
Ratchet, Parker's.....40%
Ratchet, Weston's.....40%
Ratchet, Weston's, Style H Improved.....40%
Ratchet, No. 012.....40%
Ratchet, Celebrated.....40%
Ratchet, Whitney's, P., S. & W..50%
Whitney's Hand Drill, No. 1, $10.00; Adjustable, No. 10, $12.00.....33⅓%

Twist Drills—

Bit Stock.....60&10&10@70%
Taper and Straight Shank.....60&10@60&10&5%

Drivers, Screw—

Screw D'ver Bits, per doz..45@50¢
Balsey's Screw Holder and Driver, ℔ doz., 2½-in., $6; 4-in., $7.50; 6-in., ℔.....50%
Buck Bros.' Screw Driver Bits.....30%
Champion.....50%
Disston's.....70%
Edson.....60%
Fray's Hol. H'dle Sets, No. 3, $12..50%
Ford's Brace Screw Drivers....40&10%
Gay's Double Action Ratchet.....35%
Goodell's Auto..50&10&10@50&10&10&5%
Mayhew's Black Handle.....40%
Mayhew's Monarch.....40&10%
Millers Falls, Nos. 20 and 21...25&10%
Millers Falls, Nos. 11, 12, 41, 42...15&10%
New England Specialty Co.....50&10%
Smith & Hemenway Co., Neverturn, 40&5%; Elmora.....50%
H. D. Smith & Co.'s Perfect H'dle.40%
Stanley R. & L. Co.'s:
No. 64, Varn, Handles, 60&10%; No. 86, 70%; Defiance, 70%; Hurwood, 55%.
Swan's:
Nos. 7565 to 7568, 50%; No. 7540, 40&10%

Eave Trough, Galvanized—

Territory.	*L. C. L. Galvanized*		
Galv. Steel.	*Charcoal Iron.*	*Copper. 14, 16&20 oz.*	
Eastern:			
80%	70&5%	30&10&2½%	
Central:			
75&10&7½%	70%	30&10%	
Western and Southern:			
70&20&7½%	60&15&2½%	30&7½%	
So. Western:			
70&20%	65&2½%	30&5%	

Terms,—2% for cash. Factory shipments generally delivered.
See also Conductor Pipe and Elbows.

Elbows and Shoes—

Factory shipments, all territories:
Galv. Steel and Galv. C. I. Standard Gauge.....60&10%
No. 26.....30%
No. 24.....25%
No. 22.....10%
Copper.....50%

Elbows, Stove Pipe—

The Edwards, Standard Blue, 40&10&10%; Royal Blue.....40&10&10%
Dover, one piece (R. M. Co.)....40&10%
Perfect Elbows.....40%

Emery, Turkish—

	¼ to 46:	*5½ to 220:*	*Flour.*
Kegs.....lb.	*5 ¢*	*5½¢*	*5½¢*
¼ Kegs.....lb.	*5½¢*	*5¾¢*	*5¾¢*
⅛ Kegs.....lb.	*5½¢*	*6 ¢*	*6 ¢*
10-lb. cans, 10 in case....	*6½¢*	*7 ¢*	*6 ¢*
10-lb. cans, less than 10.....	*10 ¢*	*10 ¢*	*8 ¢*
Less quantity..	*10 ¢*	*10 ¢*	*8 ¢*

NOTE.—In lots 1 to 3 tons a discount of 10% is given.

Extractors, Lemon Juice

—See *Squeezers, Lemon.*

Fasteners, Blind—

Zimmerman's .....50&10%
Walling's .....40&10%

Cord and Weight—

Ives 33⅓%

Faucets—

Cork Lined.....50@50&10%
Metallic Key, Leather Lined..
60&10@70%
Red Cedar.....40&10@50%
Petroleum.....70&10@75%
B. & L. B. Co.:
Metal Key.....60&10%
Star 60%
West Lock.....50&10%
John Sommer's Peerless Tin Key....40%
John Sommer's Boss Tin Key.....50%
John Sommer's Victor Mtl. Key.50&10%
John Sommer's Duplex Metal Key..60%
John Sommer's Diamond Lock.....40%
John Sommer's I. X. L. Cork Lined...50%
John Sommer's Reliable Cork Lined..
50&10%
John Sommer's Chicago Cork Lined.60%
John Sommer's O. K. Cork Lined....50%
John Sommer's No Brand, Cedar....50%
John Sommer's Perfection, Cedar....40%
McKenna, Brass:
Burglar Proof, N. P.....25%
Improved, ⅝ and ¾ inch.....25%
Self Measuring:
Enterprise, ℔ doz. $36.00.....40&10%
Lane's, ℔ doz. $36.00.....40&10%
National Measuring, ℔ doz. $36.40&10%

Felloe Plates—

See *Plates, Felloe.*

Files— Domestic—

List Nov. 1, 1899.
Best Brands.....70&10@75&10%
Standard Brands.75&10@75&10&10%
Lower Grade....75&10&10@80&10%

Imported—

Stubs' Tapers, Stubs' list, July 2½, '97.....33 1-3@40%

Fixtures, Fire Door—

Richards Mfg. Co.:
Universal, No. 103; Special, No. 104 .....$3.75
Fusible Links, No. 96.....50%
Expansion Bolts, No. 107.....60&10%

Grindstone—

Net Prices:

Inch	*15*	*17*	*19*	*21*
Per doz	*$3.25*	*3.75*	*4.25*	*4.75*

P., S. & W. Co.....30&10%
Reading Hardware Co.....60%
Stowell's Giant Grindstone Hanger..
℔ doz. $6.00
Stowell's Grindstone Fixtures, Extra Heavy, 40&10%; Light.....50%

Fodder Squeezers—

See *Compressors.*

Forks—

NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.

Iowa Dig-Ezy Potato.....60&10%
Victor, Hay.....60&15&2½%
Victor, Manure.....66⅔%
Victor, Header.....65%
Champion, Hay.....66⅔%
Champion, Header.....65%
Champion, Manure.....60&15&2½%
Columbia, Hay.....60&20%
Columbia, Manure.....70%
Columbia, Spading.....70&12½%
Hawkeye Wood Barley.....40%
W. & C. Potato Digger.....60&10%
Acme Hay.....60&20%
Acme Manure, 4 tine.....60&10&5%
Dakota Header.....60&20%
Jackson Steel Barley.....60&20%
Kansas Header.....65%
W. & C. Favorite Wood Barley.....40%
Plated.—See Spoons.

Frames— Saw—

White, S'g't Bar, per doz.75@80¢
Red, S'g't Bar, per doz..$1.00@1.25
Red, Dbl. Brace, per doz.$1.40@1.50

Freezers, Ice Cream—

Qt.	*1*	*2*	*3*	*4*	*6*
Each	*$1.30*	*$1.60*	*$1.90*	*$2.20*	*$2.80*

Fruit and Jelly Presses—

See *Presses, Fruit and Jelly.*

Fry Pans—See *Pans, Fry.*

Fuse— *Per 1000 Feet.*

Hemp $2.75
Cotton 3.20
Waterproof Sgl. Taped.. 3.65
Waterproof Dbl. Taped.. 4.40
Waterproof Tpl. Taped.. 5.15
10&2½%

Gates, Molasses and Oil—

Stebbins' Pattern.....80&10%

Gauges—

Marking, Mortise, &c.50@50&10%
Chapin-Stephens Co.:
Marking, Mortise, &c.....50&50&10%
Scholl's Patent.....50&10@50&10&10%
Door Hangers.....50@50&10%
Disston's Marking, Mortise, &c..67½%
Stanley R. & L. Co.'s Butt and Rabbet Gauge.....35%
Marking and Mortise.....55%
Wire, Brown & Sharpe's.....25%
Wire, Morse's.....25%
Wire, P., S. & W. Co.....30%

Gimlets— Single Cut—

Numbered assortments, per gro.
Nail, Metal, No. 1, $2.00; 2, $2.30
Spike, Metal, No. 1, $4.00; 2, $4.30
Nail, Wood Handled, No. 1, $2.30; 2, $2.60
Spike, Wood Handled, No. 1, $4.30; 2, $4.60

Glass, American Window

See *Trade Report.*

Glasses, Level—

Chapin-Stephens Co.....60@60&10%

Glue, Liquid Fish—

Bottles or Cans, with Brush..
25&10@50%
International Glue Co. (Martin's)..40%

Grease, Axle—

Common Grade....gro. $4.50@6.00
Dixon's Everlasting, 10-lb pails, ea. 85¢; in boxes, ℔ doz., 1 lb, $1.20; 2 lb.....$2.00
Helmet Hard Oil.....25%

Griddles, Soapstone—

Pike Mfg. Co.....33⅓&33⅓&10%

Grindstones—

Bicycle Emery Grinder.....$6.50
Bicycle Grindstones, each.....$2.50@3.00
Pike Mfg. Co.:
Improved Family Grindstones, ℔ inch, ℔ doz., $2.00.....33⅓%
Royal Mfg. Co.:
Alundum Grinding Machines, each, Nos. 01, $1.75; 1A, $2.50; 10, $5.00 .....30%
Alundum Sickle Grinders, each, Nos. 20A, $6.00; 20A Combined, $6.50 .....30%
Alundum Disc Grinders, each, $2.50 .....30%

Grips, Nipple—

Perfect Nipple Grips.....40&10&2%

Halters and Ties—

Cow Ties.....60&10@60&10&5%
Covert Mfg. Co.:
Web .....30&2%
Jute Rope.....35%
Sisal Rope.....20%
Cotton Rope.....45%
Hemp Rope.....45%
Oneida Community:
Am. Coil and Halters.....40@40&5%
Am. Cow Ties.....45@50%
Niagara Coil and Halters..45@50&5%
Niagara Cow Ties....45&5@50&10&5%

Hammers—

Handled Hammers—

Heller's Machinists'...55&10@55&10&5%
Heller's Farriers'.....40&5@40&10&5%
Magnetic Tack, Nos. 1, 2, 3, $1.25, $1.50, $1.75.....50%
Peck, Stow & Wilcox, Steel.....50%
Fayette R. Plumb:
Plumb, A. E. Nail.....
40&2½@40&12½%
Engineers' and B. S. Hand.....
50&12½@60%
Machinists' Hammers... 50&15@60&5%
Riveting and Tinners'.....
40&2½@40&12½%

Heavy Hammers and Sledges—

Under 3 lb., per lb., 50¢ 80&10&5%
3 to 5 lb., per lb., 40¢...80&10&5%
Over 5 lb., per lb., 30¢....
80&10&10&5%
Wilkinson's Smiths'...lb. 9½@10¢

Handles—

Agricultural Tool Handles

Axe, Pick, &c....60&10@60&10&5%
Hoe, Rake, &c.....45@50%
Fork, Shovel, Spade, &c.:
Long Handles.....45@50%
D Handles.....50@50&5%

Cross-Cut Saw Handles—

Atkins' 40%
Champion 50%
Disston's 50%

Mechanics' Tool Handles—

Auger, assorted...gro.$2.50@3.00
Brad Awl.....gro.$1.65@$1.75
Chisel Handles, Ass'd, per gro.:
Tanged Firmer, Apple, $2.40@ $2.65; Hickory.....$2.15@2.40
Socket Firming, Apple, $1.75@ $1.95; Hickory....$1.45@$1.60
Socket Framing, Hickory, $1.60@$1.75
File, assorted.....gro. $1.30@$1.40
Hammer, Hatchet, &c. 60&10@60&10&5%
Hand Saw, Varnished, doz. 80&85¢; Not Varnished...65@75¢
Plane Handles:
Jack, doz. 30¢; Jack, Bolted.75¢
Fore, doz. 45¢; Fore, Bolted.90¢
Chapin-Stephens Co.:
Carving Tool.....40@40&10%
Chisel .....65@65&10%
File and Awl.....65@65&10%
Saw and Plane.....40@40&10%
Screw Driver.....40@40&10%
Millers Falls Adj. and Ratchet Auger Handles .....20&10%
Nicholson Simplicity File Handle.....
℔ gro. $0.85@$1.50

Hangers—

NOTE.—Barn Door Hangers are generally quoted per pair, without track, and Parlor Door Hangers per double set with track, &c.

Allith Mfg. Co.:
Reliable, No. 1; Allith, No. 3; Allith Adjustable, No. 6; Reliable Parlor Door.....50%
Chicago Spring Butt Co.:
Friction 25%
Oscillating 25%
Big Twin.....25%
Chisholm & Moore Mfg. Co.:
Baggage Car Door.....50%
Elevator 30%
Railroad 50%
Cronk & Carrier Mfg. Co.:
Loose Axle.....60&10%
Roller Bearing.....70%
Griffin Mfg. Co.:
Solid Axle, No. 10, $12.00.....70%
Roller Bearing, No. 11, $15.00.70%
Roller Bearing, Ex. Hy., No. 22, $18.00.....70%
Hinged Hangers, $16.00....60&10%
Lane Bros. Co.:
Parlor, Ball Bearing, $4.00; Standard, $3.15; No. 105, $2.85; New Model, $2.80; New Champion $2.25
Barn Door, Standard.....60&5%
Hinged .....net $6.08
Covered .....60&2%
Special .....70&5%
Lawrence Bros.:
Advance and Sterling....60&2½%
Cleveland and Peerless..70&7½%
Clipper, No. 75.....60&5%
Crown .....60&2½%
Cyclone-Tandem .....net $7.50
Easy Parlor Door, Dbl. Sets, $2.50; Single Sets, $1.25.
Giant 60%
Hummer .....70&7½%
New Cyclone, Flexible, $16.00 60
New York.....60&2½%
McKinney Mfg. Co.:
No. 1, Special, $15.....60&10%
No. 2, Standard, $15.....60&10%
Hinged Hangers, $16.....50%
Meyers' Stayon Hangers.....60&5%
Richards Mfg. Co.:
Hangers, Nos. 47, 48, 147, 247, 60&5%
Pioneer Wood Track, No. 3..$2.25
Roller B'r'g St'l Track No. 12.$2.20
Roller B'r'g St'l Track No. 13.$2.50
Roller B'r'g, Nos. 39, 41, 43, 70&7½%
Hero, Adj. Track No. 19..50&10%
Adjustable Track Tandem Trolley Track No. 16.....50&10%
Seal, Steel Track No. 8.....$2.25
Auto Adj. Track No. 22.—60&5%
Trolley B, D. No. 17, $1.25; F. D. No. 120, $2.25; No. 121, $2.45; No. 150.....$2.50
Safety Underwriters F. D. No. 101 .....50%
Tandem No. 41..2½ and 3 60&10%
Palace, Adjustable Track No. 132 .....50&5%
Royal, Adjustable Track No. 122 .....50&10%
Ives' Wood Track No. 1.....$2.25
Trolley B. D. No. 29.....50&10%
Trolley B. D. No. 24, $1.30; No. 27, $1.40; No. 28.....$1.60
Roller Bearings, Nos. 37, 38, 39, 41, 43, 44, Sizes 1 and 2.70&7½%
Anti-friction, No. 42; No. 44 sizes 2½ and 3.....60%
Hinged Tandem No. 48....60&5%
Folding Door B. B. Swivel No. 135 .....40%
Stowell Mfg. & Foundry Co.:
Acme Parlor Ball Bearing....30%
Ajax Hinge Door.....60%
Apex Parlor Door.....50&10&5%
Atlas 60%
Baggage Car Door.....50%
Climax Anti-Friction.....50%
Elevator 40%
Express 50%
Lundy Parlor Door.....50%
Matchless 60%
Nansen 70%
Parlor Door, 50&10%; Railroad, 50&10%
Steel, Nos. 300, 404, 500.....50%
Underwriters' Fire Door.....40%
Wild West Warehouse Door..50%
Wilbern, No. 0, net, ℔ doz..$9.00
Zenith for Wood Track.....50%
A. L. Sweet Iron Works:
Check Back, 70%; Eagle.....70%
Climax Anti-Friction.....50&10%
Hylo Hinge, New Perfection, Pilot, Pilot Hinge.....60%
Rider Wooster.....65%
Western Pattern.....70%
Taylor & Boggis F'y Co.'s Kidder's Roller Bearing.50&15&10&5%

Extra 5&10% often given.

Hangers— Garment—

Pullman Trouser, ℔ gro., 1 pair Flat Aluminoy, $9.00; 1 pair Round Nickeled, $8.00; 4 pair Round Nickeled, $27.00; 1 pair Flat Gun Metal, $12.00; 1 pair Flat Black Enameled, $7.50; 1 pair Wood Clamp, $13.50; Skirt Hangers, Folding, per gro., $21.00; Coat Hangers, Folding, per gro., $8.00; Garment Hanger Rods, Round Nickeled, per gro., $10.50; Garment Hanger Loops, Round Nickeled, per gro.....$10.50
Victor Folding.....℔ gro. $9.60
Western, W. G. Co.....75&10%

Gate—

Myers' Patent Gate Hangers, ℔ doz. net $4.50

Joist and Timber—

Lane Bros. Co.....30%

Hasps—

Griffin's Security Hasp.....50&10%
McKinney's Perfect Hasp, ℔ doz..50%

Hatchets—

Regular list, first quality....50%
Second quality $1.00 per doz. less than first quality.

Heaters, Carriage—

Clark, No. 5, $1.75; No. 5B, $2.00; No. 3, $2.25; No. 3D, $2.75; No. 7D, $3.00; No. 9E, $3.25; No. 1, $3.50.....15%
Clark Coal, ℔ doz. $0.75.....10%

Hinges—

Blind and Shutter Hinges—

Surface Gravity Locking Blind: (Victor; National; 1868 O. P.; Niagara; Clark's O. P.; Clark's Tip; Buffalo.)

No.	*1*	*3*	*5*
Doz. pair	*$0.75*	*1.35*	*2.70*

Mortise Shutter: (L. & P., O. S., Dixie, &c.)

No.	*1*	*1½*	*2*	*2½*
Doz. pair	*$0.70*	*.65*	*.60*	*.55*

Mortise Reversible Shutter (Buffalo, &c.):

No.	*1*	*1½*	*2*
Doz. pair	*$0.70*	*.65*	*.60*

North's Automatic Blind Fixtures, No. 2, for Wood, $9.00; No. 3, for Brick, $11.50.....10%
Charles Parker Co.....70@75%
Parker Wire Goods Co.:
Hale & Benjamin Automatic Blind Hinges 20%
Hale's Blind Awning Hinges, No. 110, for wood, $9.00; No. 111, for brick, $9.00.....20%
Reading's Gravity.....60%
Stanley's Steel Gravity Blind Hinges, No. 1647½, ℔ doz. sets, without screws, $0.95; with screws, $1.25.
Wrightsville Hardware Co.:
O. S., Lull & Porter.....75&10&5%
Acme, Lull & Porter.....75&10%
Queen City Reversible.....75&10%
Shepard's Noiseless, Nos. 60, 65, 55 .....75&10%
Niagara, Gravity Locking, Nos. 1, 3 & 5.....75&10&5%
1868, Old Pat'n, Nos. 1, 3 & 5.....
75&10&5%
Tip Pat'n, Nos. 1, 3 & 5..75&10&5%
Buffalo Gravity Locking, Nos. 1, 3 & 5.....75&10&5%
Shepard's Double Locking, Nos. 20 & 25.....70%
Champion Gravity Locking, No. 75.75%
Steamboat Gravity Locking, No. 10.75%
Pioneer, Nos. 060, 45 & 5½.....75%
Empire, Nos. 101 & 103.....70%
W. H. Co.'s Mortise Gravity Locking, No. 2.....60%

Gate Hinges—

Clark's or Shepard's—Doz. sets:

No.	*1*	*2*	*3*
Hinges with L't'chs.	*$2.00*	*2.70*	*5.00*
Hinges only.....	*1.40*	*2.05*	*3.80*
Latches only.....	*.70*	*.70*	*.35*

New England:

With Latch.....*doz.*	....@$2.00
Without Latch...*doz.*	....@$1.60

Reversible Self-Closing:

With Latch.....*doz.*	....@$1.75
Without Latch...*doz.*	....@$1.35

Western:

With Latch.....*doz.*	$1.75
Without Latch.....*doz.*	$1.15

Wrightsville Hardware Co.:
Shepard's or Clark's; doz. sets.

Nos.	1	2	3
Hinges with Latches.	$2.00	2.70	5.00
Hinges only	1.40	2.05	3.80
Latches only	.70	.70	1.35

Pivot Hinges

Bommer Bros. Pivot.....40%
Lawson Mfg. Co. Matchless.....50%

Spring Hinges—

Holdback, Cast Iron...$6.50@$7.00
Non-Holdback, Cast Iron$6.25@$6.75
J. Bardsley:
Bardsley's Non-Checking Mortise Floor Hinges.....45%
Bardsley's Patent Checking..15%
Bommer Bros.:
Bommer Ball Bearing Floor..40%
Bommer Spring Hinges.....40%
No. 999 Wrot. Steel Hold Back, ℔ gr. $9.00
Chicago Spring Butt Co.:
Chicago Spring Hinges.....25%
Triple End Spring Hinges....50%
Chicago (Ball Bearing) Floor..50%
Garden City Engine House....25%
Keene's Saloon Door.....25%
Columbian Hardware Co.:
Acme, Wrought Steel.....30%
Acme, Brass.....25%
American 30%
Columbia, ℔ gr., No. 14, $9.00; No. 18, $25.00
Columbia, Adj., No. 7, ℔ gr. $12.00
Columbian Hinges.....60&10%
Gem, new list.....30%
Clover Leaf.....℔ gr. $12.00
Oxford, new list.....30%
Floor Spring Hinges.....65&10%
Lawson Mfg. Co., Matchless....30%
Richards Mfg. Co.:
Superior Double Acting Floor Hinges 40%
Shelby Spring Hinge Co.:
Buckeye All Steel Holdback Screen Door.....℔ gr. $9.00
Chief Ball Bearing Floor Hinge 50%
Ball Bearing Door.....25%
No. 777, Sheet Steel Holdb'k, ℔ gr. pr.....$9.00
Superior Spring Hinge Co.:
Superior Floor Hinges.....33⅓%
The Stover Mfg. Co.:
Ideal, No. 16, Detachable, ℔ gr. $12.50
Ideal, No. 4.....℔ gr. $9.00
New Idea No. 1.....℔ gr. $9.00
New Idea, Double Acting....50%
New Idea Floor.....50%

Extra 10% often given on most of these Hinges.

Wrought Iron Hinges—

Strap and T Hinges, &c., list December 20, 1904:
Light Strap Hinges...65%
Heavy Strap Hinges..75%
Light T Hinges.....60%
Heavy T Hinges.....55%
Extra H'y T Hinges..70%
Hinge Hasps.....45%
Cor. Heavy Strap....75%
Cor. Ex. Heavy T..70&10%
Screw Hook and Strap. { *6 to 12 in. lb. 3¼¢* / *14 to 20 in. lb. 3¼¢* / *22 to 36 in. lb. 3¼¢* }

Extra, 10&5% 10&10%

Screw Hook and Eye:
¾ to 1 inch.....lb. 6½¢
⅝-inch.....lb. 7½¢
½-inch.....lb. 8½¢

Hitchers, Stall—
Covert Mfg. Co., Stall Hitchers..30&2%

Hods— Coal—

	Per doz.			
Inch	15	16	17	18
Galv. Open	$2.50	2.75	3.00	3.25
Jap. Open	$1.90	2.10	2.25	2.55
Galv. Funnel	$3.00	3.30	3.60	3.90
Jap. Funnel	$2.45	2.65	2.85	3.30

Masons' Etc.—
Cleveland Wire Spring Co.:
Steel Brick, No. 162.....each $1.05
Steel Mortar, No. 158.....each $1.35

Hoes— Eye—
Scovil and Oval Pattern.....
60&10@60&10&10%
Grub, list Feb. 23, 1899.....
70&10@75&10%
D. & H. Scovil.....30%

Handled—
NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.
Cronk's Weeding, No. 1, $2.75; No. 2, $2.50
Star Double Bit.....$3.20
Ft. Madison Cotton Hoe....70&10&10%
Ft. Madison Crescent Cultivator Hoe, ₱ doz.....70&10%
Ft. Madison Mattock Hoes:
Regular Weight.....₱ doz. 65%
Junior Size.....₱ doz. $4.00
Ft. Madison Sprouting Hoe..₱ doz. 50%
Ft. Madison Dixie Tobacco Hoe.....
75&10&7½%
Kretsinger's Cut Easy.....70&10%
Warren Hoe.....45&10%
W. & C. Ivanhoe.....75&2%
B. B. 6 in., Cultivator Hoe.....$3.15
B. B., 6½ in.....$3.35
Acme Wedding.....₱ doz., net, $4.35
W. & C. L'ting Shuffle Hoe, ₱ doz. $4.85

Hoisting Apparatus—
See *Machines, Hoisting.*

Holders— Bit—
Angular, ₱ doz. $24.00.....45&10%

Door—
Bardsley's.....45%
Empire.....50%
Pullman.....35%
Superior.....33⅓%

File and Tool—
Nicholson File Holders and File Handles.....33⅓&40%

Fruit Jar—
Triumph Fruit Jar Holder, ₱ gross, $10.80; ₱ doz.....$1.25

Trace and Rein—
Fernald Double Trace Holder, ₱ doz. pairs.....$1.25
Dash Rein Holder, ₱ doz. pairs..$1.25

Hones—Razor—
Pike Mfg. Co., Belgian, German and Swaty.....50%

Hooks—Cast Iron—
Bird Cage, Reading.....40%
Clothes Line, Reading List.....40%
Clothes Line, Stowell's.....70%
Coat and Hat, Reading.....45&20%
Coat and Hat, Stowell's.....70%
Coat and Hat, Wrightsville.....65%
Harness, Reading List.....40%
Harness, Stowell's.....60%
School House, Stowell's.....70%

Wire—
Belt.....80&10@..%
Wire C. & H. Hooks:.....
75&10@75&10&10%
Columbian Hdw Co., Gem.....70&10%
Parker Wire Goods Co., King..70&10%
Western W. G. Co, Molding.....75%
Wire Goods Co.:
Acme, 60&10%; Chief, 70%; Crown, 75%; Czar, 65%; V Brace, 75%; Czar Harness, 50&10%.

Wrought Iron—
Box, 6 in., per doz., $1.00; 8 in., $1.25; 10 in., $1.50.
Cotton.....doz. $1.05@$1.25
Wrought Staples, Hooks, &c.—
See Wrought Goods.

Miscellaneous—
Hooks, Bench, see *Stops, Bench.*
Bush, Light, doz. $4.75; Medium, $5.35; Heavy, $6.25
Grass, best, all sizes, per doz.$1.60
Grass, common grades, all sizes, per doz.....$1.30
Whiffletree.....lb. 5¾@6¢
Hooks and Eyes:
Brass.....60&5@60&10&5%
Malleable Iron.....70@70&10%
Covert Mfg. Co, Gate and Scuttle Hooks.....40%
Ft. Madison Cut-Easy Corn Hooks, ₱ doz. $3.25 net
Bench Hooks—See Bench Stops.
Corn Hooks—See Knives, Corn.

Horse Nails—
See *Nails, Horse.*

Horseshoes—
See *Shoes, Horses.*

Hose, Rubber—
Garden Hose, ¾-inch:
Competition.....ft. 5 @ 6 ¢
3-ply Guaranteed..ft. 8 @ 9 ¢
4-ply Guaranteed..ft. 10 @11 ¢
Cotton Garden, ¾-in., coupled:
Low Grade.....ft. 8 @ 9 ¢
Fair Quality.....ft. 10 @11 ¢

Irons— Sad—
From 1 to 10.....lb. 3 @3½¢
R. B. Sad Irons.....lb. 3½@3¼¢
Mrs. Potts', cents per set:

	Nos. 50	55	60	65
Jap'd Tops	65	62	75	72
Tin'd Tops	70	67	80	77

New England Pressing.lb. 3¾@4¢

Pinking—
Pinking Irons.....doz. 60¢

Irons, Soldering
See *Copiers.*

Jacks, Wagon—
Covert Mfg. Co.:
Auto Screw.....30&2%; Steel, 45%
Lockport.....5%
Lane's Steel.....30&10&2%
Richards' Tiger Steel, No. 130...50&10%
Smith & Hemenway Co.'s.....55%

Kettles—
Brass, Spun, Plain.....20@25%
Enameled and Cast Iron—See Ware, Hollow.

Knives—
Butcher, Kitchen, &c.—
Foster Bros.' Butcher, &c.....30%
Wilkinson Shear & Cutlery Co.....60%

Corn—
Wilkinson Shear & Cutlery Co., Wilcut Brand Knives and Hooks.60%
Withington Acme, ₱ doz., $2.65; Dent, $2.75; Adj. Serrated, $2.20; Serrated, $2.10; Yankee No. 1, $1.50; Yankee No. 2, $1.15.

Drawing—
Standard List.....75&5@75&10%
C. E. Jennings & Co., Nos. 45, 46..60%
Jennings & Griffin, Nos. 41, 42.....75%
Swan's.....70%
Watrous.....16⅔%
L. & I. J. White.....20&5@25%

Hay and Straw—
Serrated Edge, per doz.$5.75@6.00
Iwan's Sickle Edge.....₱ doz. $9.50
Iwan's Serrated.....₱ doz. $10.00

Mincing—
Buffalo.....₱ gro. $13.00

Miscellaneous—
Farriers'.....doz. $3.00@3.25
Wostenholm's.....₱ doz. $3.00@3.25

Knobs—
Base, 2½-inch, Birch, or Maple, Rubber Tip.....gro. $1.25@$1.40
Carriage, Jap., all sizes.....
gro. 40@45¢
Door, Mineral.....doz. 65@70¢
Door, Por. Jap'd.....doz. 70@75¢
Door, Por. Nickel..doz. $2.05@2.15
Bardsley's Wood Door, Shutters, &c.15%

Lacing, Leather—
See *Belting, Leather—*

Ladders, Store, &c.—
Allith Mfg. Co., Reliable.....50%
Lane's Store.....25%
Myers' Noiseless Store Ladders....50%
Richards Mfg. Co.:
Improved Noiseless, No. 112.....50%
Climax Shelf, No. 113.....50%
Trolley, No. 109.....50%

Ladles, Melting—
L. & G. Mfg. Co.' (low list).....25%
P. S. & W.....40&10%
Reading.....60%

Lanterns—Tubular—
Regular Tubular, No. 0.....
doz.$4.25@4.50
Lift Tubular, No. 0.....
doz.$4.75@5.00
Hinge Tubular, No. 0.....
doz.$4.75@5.00
Other Styles.....40@40&5%

Bull's Eye Police—
No. 1, 2¾-inch.....$2.75@3.00
No. 2, 3-inch.....$3.00@3.25

Lasts and Stands, Shoe—
Stowell's Atlas, Malleable Iron.....50%
Stowell's Badger, Cast Iron.....50%

Latches— Thumb—
Roggin's Latches, with screw..
doz. 35@40¢

Door—
Allith Mfg. Co., Automatic, No. 400, ₱ doz.....$4.00
Cronk & Carrier Mfg. Co., No. 101, ₱ doz. $2.00
Cronk & Carrier Mfg. Co., Latch, Hasp and Staples.....50%
Richards' Bull Dog, Heavy, No. 125.....50&5%
Richards' Trump, No. 127.....$1.50
Stowell's Steel.....50%

Leaders, Cattle—
Small.....doz. 50¢; *large, 60¢*
Covert Mfg. Co.:
Cotton, 45%; Hemp, 45%; Jute, 35%; Sisal, 20%.

Lifters, Transom—
R. & E.....10%

Lines—
Wire Clothes, Nos. 18 19 20
100 feet.....$2.25 2.00 1.75
75 feet.....$1.75 1.55 1.10
Anniston Waterproof Clothes, 50 ft., ₱ gro., $25.00; Gilt Edge $23.00; Air Line, $23.00; Acme, $18.00; Alabama, $17.00; Empire, $16.00; Advance, $14.00; Eclipse, $13.50; Chicago, $11.50; Standard, $10.50; Columbia, $9.50; Allston, $13.50; Calhoun, $12.00.
Samson Cordage Works:
Solid Braided Chalk, Nos. 0 to 3..40%
Solid Braided Masons'.....30%
Silver Lake Braided Chalk, No. 0, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50.....₱ gr. 20%
Masons' Lines, Shade Cord, &c.:
White Cotton, No. 3½, $1.50; No. 4, $2.00; No. 4½, $2.50; Colors, No. 3½, $1.75; No. 4, $2.25; No. 4½, $2.75; Linen, No. 3½, $2.50; No. 4, $3.50; No. 4½, $4.50.....20%
Tent and Awning Lines: No. 5, White Cotton, $7.50; Drab Cotton, $8.50.....20%
Clothes Lines, White Cotton: 50 ft., $2.75; 60 ft. $3.25; 70 ft., $3.75; 75 ft., $4.00; 80 ft., $4.25; 90 ft., $4.75; 100 ft., $5.25.....20%

Locks— Cabinet—
Cabinet Locks...33⅓@33⅓&7½%
Door Locks, Latches, &c.—
NOTE.—Net Prices are very often made on these goods.
Reading Hardware Co.....40%
R. & E. Mfg. Co.....10%

Elevator—
Stowell's.....50%

Padlocks—
Wrought Iron....75&10&5@80&5%
Net prices are general.
R. & E. Mfg. Co., Wrought Steel and Brass.....75&10%

Sash, &c.—
Ives' Patent:
Bronze and Brass, 60%; Crescent, 40&20%; Iron, 60%; Window Ventilating, 55%; Robinson Pat. Ventilating Sash Lock, 33⅓%; Wrought Bronze and Brass, 55%; Wrought Steel, 55%.
Pullman Patent Ventilating Lock..35%
Reading.....40%

Machines—Boring—
Com. Upr't, without Augers,
$2.00@2.25
Com. Angl'r, without Augers,
$2.25@2.50
Swan's Improved.....40&10%
Jennings', Nos. 1 and 4.....33⅓%
Millers' Falls.....5.75
Snell's, Upright, $2.65; Angular, $2.90

Corking—
Reisinger Invincible Hand Power.....
₱ doz. $18.00

Fence—
Williams' Fence Machines....each, $5.50

Hoisting—
Moore's Anti-Friction Differential Pulley Block.....30%
Moore's Hand Hoist, with Lock Brake.....20%
Moore's Cyclone High Speed Chain Hoist.....25%

Ice Cutting—
Chandler's.....12½%

Washing—

Boss Washing Machine Co.:	Per doz.
Boss No. 1	$57.00
Boss Rotary	$54.00
Champion Rotary Banner No. 1	$54.00
Standard Champion No. 1	$48.00
Standard Perfection	$26.00
Cint Square Western	$30.00
Unceda American, Round	$30.00

Mallets—
Hickory.....45&5@50%
Lignumvitæ.....45&5@50%
Tinners' Hickory and Apple-wood.....doz. 45&5@50%

Mangers, Stable—
Swett Iron Works.....50%

Mashers, Vegetable—
Western, W. G. Co., Potato....60&10%

Mats, Door—
Elastic Steel (W. G. Co.), new list.50%
Keystone Wire Matting Co.:
Keystone.....50%
Ideal.....50%

Mattocks—
See *Picks and Mattocks.*

Milk Cans—See *Cans, Milk.*

Mills, Coffee, &c.—
Enterprise Mfg. Co.....20@25%
National list Jan. 1, 1902.....30%
Parker's Columbia & Victoria.50&10&6%
Parker's Box and Side.....50&10@60%
Swift, Lane Bros. Co.....30%

Motors Water—
Divine's Red Devil.....30%

Mowers, Lawn—
NOTE.—Net prices are generally quoted
Cheapest.....*all sizes, $1.85@2.00*
Cheap.....*all sizes, $2.00@2.50*
Better Grade..*all sizes, $2.50@4.50*

	12	14	16	18-in.
High Grade	$4.50	4.75	5.00	5.25

Continental.....60&5%
Great American.....70%
Great American Ball B'r'g, new list.70%
Quaker City.....70%
Pennsylvania.....60&5%
Pennsylvania, Jr., Ball Bearing.....60%
Pennsylvania Golf.....50%
Pennsylvania Horse.....33⅓&5%
Pennsylvania Pony.....40&5%
Granite State:
Style A, Low Wheel.....70&10&10%
Style B, Low Wheel.....70&10%
Style C, High Wheel.....70&10%
Style D, High Wheel.....70%
Philadelphia:
Styles M., S., C., K., T....70&10&5%
Style A, all Steel.....60&10&5%
Style E, High Wheel.....70&10&5%
Drexel and Gold Coin, special list.40%

Nails—
Wire Nails and Brads, Miscellaneous.....85&10@85&10&5%
Cut and Wire. See *Trade Report.*
Hungarian, Finishing, Upholsterers' &c. See *Tacks.*

Horse—

Nos.	6	7	8	9	10	
Anchor	23	21	20	19	18	...40&5%
Champlain	26	26	25	24	23	.....50%
Coleman	13	12	12	11	11	.....net
New Haven	23	21	20	19	18	...40&5%
Livingston	19	18	17	16	16	.....10%

Western.....₱ lb 8½¢
Jobbers' Special Brands.....
per lb.9@10¢

Picture—

	1½	2	2½	3	in.
Brass H'd.	.45	.55	.60	.70	.. gro
Por. Head	1.10	1.10	1.10		.. gro

Nippers—
See *Pliers and Nippers.*

Nuts—
Cold Punched: *Off list.*
Square, Blank or Tapped..
4.80@4.90¢
Hexagon, Blank or Tapped..
5.20@5.30¢
Square, Blank, C. & T.5.10@5.20¢
Hexagon, Blank, C. & T..
5.80@5.90¢
Hot Pressed:
Square, Blank.....5.00@5.10¢
Hexagon, Blank.....5.40@5.50¢
Square, Tapped.....4.90@5.00¢
Hexagon, Tapped....5.30@5.40¢

Oakum—
Best.....lb., 6½¢
U. S. Navy.....lb., 6¢
Navy.....lb., 5¢
Plumbers' Spun Oakum.....5¾¢
In carload lots ⅛¢ lb. off, f.o.b. New York.

Oil Tanks—See *Tanks, Oil.*

Oilers—
Brass and Copper.....50&10%
Tin or Steel.....65&10&5@70%
Zinc.....65&10&5@70%
Chase or Paragon:
Brass and Copper.....50&10%
Tin or Steel.....65&10%
Zinc.....65&10%
Malleable, Hammers' Improved, Nos. 11, 12 and 13, 20%; Old Pattern, Nos. 1, 2, 3, 50%.
American Tube & Stamping Co.:
Spring Bottom Cans.....70&10&10%
Railroad Oilers, &c.....60@60&10%

Openers— Can— *Per doz.*
Sprague, Iron Handle....30@35¢
Sprague, Wood Handle...35@40¢
Sardine Scissors.....$1.75@$3.00
National.....50&10%
Vim Tin Shear and Can Opener, ₱ doz., 75c.; per gro., $7.50

Egg—
Nickel Plate, ₱ doz., $2.00; Silver Plate, $4.00.

Packing—
Asbestos Packing, Wick and Rope.....17@22¢

Rubber—
(*Fair quality goods.*)
Sheet, C. I.....11@12¢
Sheet, C. O. S.....11@12¢
Sheet, C. B. S.....12@13¢
Sheet, Pure Gum.....40@45¢
Sheet, Red.....40@50¢
Jenkins' '96, ₱ lb, 80¢.....25%

Miscellaneous—
American Packing...lb. 7@10 ¢
Cotton Packing.....lb. 16@25 ¢
Italian Packing.....lb. 9@12½¢
Jute.....lb. 4@ 4½¢
Russia Packing.....lb. 8@11 ¢

Pails, Creamery—
R. M. Co., with gauges, ₱ doz., No. 1, $6.25; No. 2, $6.50.

Pails, Water, Well, &c.—
See *Buckets.*

Pans— Dripping—
Standard List.....65&10%

Fry—
Common Lipped:

Nos.	1	2	3	4	5
Per doz	$0.75	0.80	0.90	1.10	1.30

Refrigerator, Galva.—

Inch	12	14	16	18
Per doz	$1.75	2.25	2.80	3.15

Roasting and Baking—
Regal, R. M. Co., ₱ doz., Nos. 5, $1.50; 10, $5.25; 20, $5.75; 30, $6.25.
Savory ₱ doz., net, Nos. 200, $9.00; 400, $15.00.
Simplex, ₱ gro.:

No.	40	50	60	140	150	160
	$30.00	35.00	42.00	34.00	39.00	46.00

Paper—Building Paper

Asbestos:	lb.
Roll Board or Building Felt, 6 to 30 lb., per 100 sq. ft.	3½@5¢
Roll Board or Building Felt, 3-32 and ⅛ in., 45 to 60 lb., per 100 sq. ft.	6¢
Mill Board, Sheet, 40 x 40 in., 1-32 to ½ in.	3@15¢

Per roll

Ros'n Sized Sheathing: 500 sq. ft.	
Light weight, 25 lbs. to roll	40@50¢
Medium weight, 30 lbs. to roll	50@55¢
Heavy weight, 40 lbs. to roll	65@70¢
Black Water Proof Sheathing, 500 sq. ft., 1 ply, 65¢; 2 ply, 85¢; 3 ply, $1.10; 4 ply, $1.25.	
Deafening Felt, 9, 6 and 4½ sq. ft. to lb. ton	$50.00
Red Rope Roofing, 250 sq. ft. per roll	$1.75

Tarred Paper—
1 ply (roll 400 sq. ft.), ton....
$31.00@$35.00
2 ply, roll 108 sq. ft.....57¢
3 ply, roll 108 sq. ft.....80¢
Slater's Felt (roll 500 sq. ft.).76¢

Sand and Emery—
Flint Paper and Cloth.50&10@—%
Garnet Paper and Cloth....25%
Emery Paper and Cl'h..50&10@60%

Parers— Apple—

Advance	₱ doz.	$4.00
Baldwin	₱ doz.	$4.00
Bonanza Improved	each	$6.50
Daisy	₱ doz.	$4.00
Dandy	each	$7.50
Eureka Improved	each	$20.00
Family Bay State	₱ doz.	$15.00
Improved Bay State	₱ doz.	$36.00
Little Star	₱ doz.	$5.00
New Lightning	₱ doz.	$7.00
Reading 72	₱ doz.	$3.25

Reading 78.....℔ doz. $6.25
Rocking Table.....℔ doz. $6.20
Turn Table '98.....℔ doz. $6.00
White Mountain.....℔ doz. $5.00

Potato—

Saratoga.....℔ doz. $7.00
White Mountain.....℔ doz. $6.00

Picks and Mattocks—

List, Feb. 23, 1899.....75@75&5%
Cronk's Handled Garden Mattock, ℔ doz., No. 2, $2.60; No. 3, $6.40.

Pinking Irons—

See *Irons, Pinking.*

Pins, Escutcheon—

Brass.....50&10@60%
Iron, list Nov. 11, '85..60@60&10%

Pipe, Cast Iron Soil—

Carload lots.
*Standard, 2-6 in.*50&10@50&10&5%
Extra Heavy, 2-6 in......65&10%
Fittings.....70&10@70&10&5%

Pipe, Merchant—

Consumers, Carloads.

	Steel. Blk.	Galv.	Iron. Blk.	Galv.
⅛ & ¼ in.	69%	53%	64.5%	48.5%
⅜ in.	71%	57%	64.5%	56.5%
½ in.	73%	61%	72.5%	62.5%
¾ to 6 in.	77%	67%	72.5%	62.5%
7 to 12 in.	72%	57%	68 %	53 %

Pipe, Vitrified Sewer—

Carload lots.
Standard Pipe and Fittings, 3 to 24 in., f.o.b. factory:
First-class.....85@86%
Second-class.....90%
NOTE.—Market irregular.

Pipe, Stove—

	Per 100 joints. C. L.	L. C. L.
Edwards' Nested:		
5 in., Standard Blue	$6.25	$7.25
6 in., Standard Blue	6.75	7.75
7 in., Standard Blue	7.75	8.25
5 in., Royal Blue	7.00	8.00
6 in., Royal Blue	7.50	8.50
7 in., Royal Blue	8.50	9.50

Planes and Plane Irons—
Wood Planes—

Bench, first qual.....35@35&10%
Bench, second qual....45@45&10%
Molding.....30@30&10%
Bailey's (Stanley R. & L. Co.).35&2½%
Chapin-Stephens Co.:
Bench, First Quality.....35%
Bench, Second Quality.....45%
Molding and Miscellaneous.....30%
Toy and German.....35%
Union.....60%

Iron Planes—

Bailey's (Stanley R. & L. Co.)....35%
Chapin's Iron Planes.....50&10%
Miscellaneous Planes (Stanley R. & L. Co.).....30&5%
Union.....60%

Plane Irons—

Wood Bench Plane Irons....25@25&10%
Buck Bros.....30%
Chapin-Stephens Co.....25%
Stanley R. & L. Co.....35%
Union.....50%
L. & I. J. White.....20&5@25%

Planters, Corn, Hand—

Kohler's Eclipse.....℔ doz. $8.00

Plates—

Felloe.....*lb.* 4@4¼¢
Self-Sealing Pie Plates (R. M. Co.), ℔ doz. $2.00.....50%

Pliers and Nippers—

Button Pliers....75&10@75, 10, 5%
Gas Burner, per doz., 5 in., $1.25 @ $1.30; 6 in., $1.45 @ $1.50.
Gas Pipe.. 7 8 10 12-in.
$2.00 $2.25 $2.75 $3.50
Acme Nippers.....50&5%
Cronk & Carrier Mfg. Co.:
American Button.....75&10%
Cronk's.....60%
Stub's Pattern.....50%
Combination and others.....33⅓%
Heller's Farriers' Nippers, Pincers and Tools.....40&5@40&10&5%
The Nettleton Mfg. Co. Reversible Cutting Nippers.....40%
P., S. & W. Tinners' Cutting Nippers.....40%
Wm. Schollhorn Co.:
Bernard, 33⅓%; Elm City, 33⅓%; Paragon, 50%; Lodi, 50%.
Swedish Side, End and Diagonal Cutting Pliers.....50%
Utica Drop Forge & Tool Co.:
Pliers and Nippers, all kinds.....40%

Plumbs and Levels—

Chapin-Stephens Co.:
Plumbs and Levels.....30@30&10&5%
Chapin's Imp. Brass Cor..40@40&10%
Pocket Levels.....30@30&10&5%
Extension Sights.....30@30&10&5%
Machinists' Levels.....40@40&10%
Disston's Plumbs and Levels.....67½%
Disston's Pocket Levels.....67½%
C. E. Jennings & Co.'s Iron.....33⅓%
C. E. Jennings & Co.'s Iron, Adjustable.....40&7½%
Stanley R. & L. Co.....40%
Stanley's Duplex.....33⅓%
Woods' Extension.....33⅓%

Poachers, Egg—

Buffalo Steam Egg Poachers, ℔ doz., No. 1, $6.00; No. 2, $9.00; No. 3, $9.00; No. 4, $12.00.....50%

Points, Glaziers'—

Bulk and 1-lb. papers.....*lb.* 10¢
½-lb. papers.....*lb.* 9@10½¢
¼-lb. papers.....*lb.* 9½@11¢

Pokes, Animal—

Ft. Madison Hawkeye.....℔ doz. $3.25
Ft. Madison Western.....℔ doz. $4.00

Police Goods—

Manufacturers' Lists...25@25&5%
Tower's.....25%

Polish—Metal, Etc—

Glasbrite, No. 2, 5 lb can (powder), each, $1.25; ℔ doz., $12.00; No. 2, 10 lb can (cake), each, $2.50; ℔ doz., $24.00.
Prestoline Liquid, No. 1 (½ pt.), ℔ doz., $3.00; No. 2 (1 qu.), $9.00..40%
Prestoline Paste.....40%
George William Hoffman:
U. S. Metal Polish Paste, 3 oz. boxes, ℔ doz. 50¢; ℔ gro. $4.50; ½ lb boxes, ℔ doz. $1.25; 1 lb boxes, ℔ doz. $2.25.
U. S. Liquid, 8 oz. cans, ℔ doz., $1.25.
Barkeepers' Friend Metal Polish, ℔ doz., $1.75.
Wynn's White Silk, ½ pt. cans, ℔ doz.....$2.00

Stove—

Black Eagle Benzine Paste, 5 lb cans, ℔ lb 10¢
Black Eagle, Liquid, ½ pt. cans.. ℔ doz. 75¢
Black Jack Paste, ¾ lb cans, ℔ gr. $9.00
Black Kid Paste, 5 lb can....each, $0.65
Ladd's Black Beauty Liquid, per 100 tins.....$6.75
Joseph Dixon's, ℔ gr. $5.75.....10%
Dixon's Plumbago.....℔ lb 8¢
Fireside.....℔ gr. $2.50
Gem, ℔ gr, $1.50.....10%
Japanese.....℔ gr. $3.50
Jet Black.....℔ gr. $3.50
Peerless Iron Enamel, 10 oz. cans.. ℔ doz. $1.50
Wynn's:
Black Silk, 5 lb pail.....each 70¢
Black Silk, ½ lb box.....℔ doz. $1.00
Black Silk, 5 oz. box.....℔ doz. $0.75
Black Silk, ½ pt. liq.....℔ doz. $1.00

Poppers, Corn—

1 qt., Square.....*gro.* $8.00
1 qt., Round.....*gro.* $9.00
1½ qt., Square.....*gro.* $10.00
2 qt., Square.....*gro.* $12.00

Post Hole and Tree Augers and Diggers—

See also *Diggers, Post Hole, &c.*

Posts, Steel—

Steel Fence Posts, each, 5 ft., 42¢; 6 ft., 46¢; 6½ ft., 48¢.
Steel Hitching Posts.....each $1.30

Potato Parers—

See *Parers, Potato.*

Pots, Glue—

Enameled.....40%
Tinned.....35%

Powder—

In Canisters:
Duck, 1 lb.....*each* 45¢
Fine Sporting, 1 lb....*each* 75¢
Rifle, ½-lb.....*each* 15¢
Rifle, 1-lb.....*each* 25¢
In Kegs:
12½-lb. kegs.....$3.50
25-lb. kegs.....$4.50
King's Semi-Smokeless:
Keg (25 lb bulk).....$6.50
Half Keg (12½ lb bulk).....$3.50
Quarter Keg (6¼ lb bulk).....$1.90
Case 24 (1 lb cans bulk).....$8.50
Half case (1 lb cans bulk).....$4.50

King's Smokeless:	Shot Gun.	Rifle.
Keg (25 lb bulk)	$12.00	$15.00
Half Keg (12½ lb bulk)	6.25	7.75
Quarter Keg (6¼ lb bulk)	3.25	4.00
Case 24 (1 lb cans bulk)	14.00	17.00
Half case 12 (1 lb c. bk)	7.25	8.75

Robin Hood Sm'less Shot Gun..50&20%

Presses—

Fruit and Jelly—

Enterprise Mfg. Co.....20@25%

Seal Presses—

Morrill's No. 1, ℔ doz., $20.00.....50%

Pruning Hooks and Shears

See *Shears.*

Pullers, Nail—

Cyclops.....50%
Miller's Falls, No. 3, ℔ doz., $12.00..... 33⅓&10%
Morrill's No. 1, Nail Puller, ℔ doz. $20.00.....50%
Pearson No. 1, Cyclone Spike Puller, each $30.00.....50%
Scranton, Case Lots:
No. 2B (large).....$5.50
No. 3B (small).....$5.00
Smith & Hemenway Co.:
Diamond B, case lots, ℔ doz., Large, $9.00; Small, $7.50.
Giant No. 1, ℔ doz., $18; No. 1½, $16.50; No. 3, $15.....33⅓%
Staple Pullers, Utica and Davison.....60%
Parrot Tack and Stub Puller, ℔ doz. 75c.: ℔ gro., $6.00

Pulleys, Single Wheel—

Inch	1½	1¾	2	3
Awning or Tackle, doz.	$0.30	.45	.60	1.05
Hay Fork, Swivel or Solid Eye, doz., 1 in., $1.25; 5 in., $1.55				
Inch	2	2¼	2½	
Hot House, doz.	$0.65	.85	1.20	
Inch	1¼	1½	1¾	2
Screw, doz.	$0.16	.19	.23	.30
Inch	1¾	2	2¼	2½
Side, doz.	$0.25	.40	.55	.60
Inch	1½	1¾	2	2½

Stowell's:
Ceiling or End, Anti-Friction..60&10%
Dumb Waiter, Anti-Friction..60&10%
Electric Light.....60%
Side, Anti-Friction.....60&10%

Sash Pulleys—

Common Frame; Square or Round End, per doz, 1¾ and 2 in.....*16@19¢*

Auger Mortise, no Face Plate, per doz., 1¾ and 2 in....17@19¢
Acme.....1¾ in., 16¢; 2 in., 19¢
Fox-All-Steel, Nos. 3 and 4, 2 in.... ℔ doz. 50%
Grand Rapids All Steel Noiseless..50%
Ideal.....70&5%
Niagara.....1¾ in., 16¢; 2 in., 19¢
No. 26, Troy..1¾ in., 14½¢; 2 in., 16½¢
Star.....1¾ in., 16¢; 2 in., 19¢
Tackle Blocks—See Blocks.

Pumps—

Cistern.....60%
Pitcher Spout...75&10@75&10&5%
Wood Pumps, Tubing, &c..45@50%
Barnes Dbl. Acting (low list).....50%
Barnes' Pitcher Spout.....75&10&5%
Contractors' Rubber Diaphragm No. 2, B. & L. Block Co.....$16.00
Daisy Spray Pump.....℔ doz. $6.50
Flint & Walling's, Fast Mail Hand, (low list).....55%
Flint & Walling's Fast Mail (low list).....55&5%
Flint & Walling's Tight Top Pitcher.80%
National Specialty Mfg. Co. Measuring, Nos. 2, $6.00; 3, $5.50.....30%
Myers' Pumps (low list).....50%
Myers' Power Pumps.....50%
Myers' Spray Pumps.....50%

Pump Leathers—

Plunger and Lower Valve—Per gro.:

Inch...	2	2¼	2½	2¾
	$2.20	2.50	2.75	3.00
Inch...	3	3¼	3½	4
	$3.30	3.60	3.85	4.40	4.40

Plunger Cup Leathers—Per 100:

Inch...	2½	3	3½	4
	$2.75	3.85	5.00	6.00

Punches—

Saddlers' or Drive, good..... *doz.* 50@75¢
Spring, single tube, good quality.....$1.75@2.00
Revolving (4 tubes)..... *doz.* $3.50@3.75
Bemis & Call Co.'s Cast St'l Drive.50%
Bemis & Call Co.'s Check.....55%
Morrill's Nos. 1AA, 1A, 1B, 1C, $15.00.....50%
Hercules, 1 die, each $5.00.....50%
Niagara Hollow Punches.....40%
Niagara Solid Punches.....55&10%
Wm. Schollhorn Co.:
Belt and Ticket, Bernard, 33⅓%; Paragon, 50%; Lodi.....50%
Steel Screw, R. & K. Mfg. Co.....50%
Tinners' Hollow, P., S. & W. Co.33⅓%
Tinners' Solid, P., S. & W. Co., ℔ doz., $1.44.....50%

Rail—Barn Door, &c.—

Sliding Door, Painted Iron.... 2½@2¾¢
Sliding Door, Wrought Brass, 1½ in., lb., 36¢.....30%
Allith Mfg. Co.: Reliable Hanger Track.....50%
Cronk's:
Double Braced Steel Rail..℔ ft. 2¾¢
O. N. T. Rail.....2½¢
Griffin's:
xxx, ℔ 100 ft., 1 x 3-16 in., $3.00; 1¼ x 3-16 in., 3.50.
Hinged Hanger, ℔ 100 ft., 1 x 3-16 in., $3.10; 1¼ x 3-16 in., $3.80.
Lane's:
Hinged Track, ℔ 100 ft., 1 in., $3.40; 1¼ in., $3.96.
O. N. T., ℔ 100 ft., 1 in., $3.00; 1¼ in., $3.60; 1½ in., $4.00.
Standard, 1¼ in.....℔ 100 ft. $4.00
Lawrence Bros.:
℔ 100 ft., No. 201, $4.00; No. 202, $4.00
New York, 1 x 3-16 in., ℔ 100 ft. $3.00
McKinney's:
Hinged Hanger Rail, ℔ ft., 11¢..50%
None Better.....℔ ft. 3¾¢
Standard.....℔ ft. 4¢
Myers' Stayon Track.....60&10%
Richards' Mfg. Co.:
Common, 1 x 3-6 in., $3.00; 1¼ x 3-16, $3.25; 1¼ x 3-16, $3.50.
Special Hinged Hanger Rail...60&10%
Lag Screw Rail, No. 65.....50%
Gauge Trolley Track, ℔ ft., No. 31, 9¢; No. 32, 14¢; No. 33, 20¢.
No. 50.....60&10%
Nos. 61, $3.00; 62, $3.25; 63, $3.50; 64, $4.00; 45, $3.25; 46, $3.50; 49, No. 1, $3.25; 49, No. 2, $3.50.
Stowell's:
Cast Rail.....℔ ft. 2¼¢
Steel Rail, Plain.....28%
Wrought Bracket, 1 3-16 in....℔ ft. 7¢
Wrought Bracket, 1½ x 5-16..℔ ft. 7¢
Swett's Hylo, ℔ ft. 11¢.....60%
P. L. B. Steel Rail.....℔ 100 ft. $3.00
No. 0, 1 x 3-16.....℔ 100 ft. $3.00

Rakes—

NOTE.—Many goods are sold at net prices.
Fort Madison Red Head Lawn....$3.25
Fort Madison Blue Head Lawn....$2.70
Jackson Lawn, 29 and 30 teeth, ℔ doz., net.....$4.25
Cronk's:
New Champion Garden, ℔ doz., 12 teeth, $15.00; 14, $16.50; 16, $18.00..75%
Victor Garden, ℔ doz., 12 teeth, $15.00; 14, $16.50; 16, $18.00.....60%
Queen City Lawn, ℔ doz., 20 teeth, $2.85; 24, $3.00.....net
Anticlog Lawn, ℔ doz.....$4.00
Malleable Garden.....70&10%
Ideal Steel Garden, ℔ doz., 12 teeth, $15.00; 14, $16.00; 16, $18.00.....80%
Kohler's:
Lawn Queen, 20-tooth....℔ doz. $2.90
Lawn Queen, 24-tooth....℔ doz. $3.00
Paragon, 20-tooth.....℔ doz. $2.70
Paragon, 24-tooth.....℔ doz. $2.75
Steel Garden, 14-tooth....℔ doz. $2.40
Malleable Garden, 14-tooth, ℔ doz. $1.75@2.00

Rasps, Horse—

Disston's.....75%
Heller Bros.'.....70&5@70&10&5%
Liveright Bros.' Gold Medal.70&10@75%
New Nicholson.....70&10@75%
See also Files.

Razors—

Liana Bo-ras-ic.....60%
Fox Razors, ℔ doz., No. 42, $20.00; No. 44, $20.00; No. 82, Platina, $25.00. } Dis. 40%
Red Devil.....50%
Silberstein:
Carbo Magnetic, $21.00; Griffon, No. 65, $13.50; Griffon, No. 00, $12.00; all other Razors, 40%.

Safety Razors—

Kampfe Bros.:
Star Safety, 25%; Star Interchangeable, 25%; Star Safety Corn, 25%.
Silberstein.....40%

Reels, Fishing—

Hendryx:
M 6, Q 6, A 6, B 6, M 9¼, M 16, Q 16, A 16, B 16, 4008, Rubber, Populo, Nickeled Populo.....20%
Aluminum, German Silv., Bronze.25%
1240 N, 124 N.....20%
3004 N, 06 N, 6 RM, G 9.....25%
4 N, 6 PN 24 N, 26 PN.....20%
2904 P, 33⅓%; 2904 PN, 33⅓%; 0924 N., 33⅓%; 02084 N., 33⅓%; 002904 PN., 33⅓%; 802 N., 33⅓%.....
986 PN, 2904 N, 974 PN.....25%
5009 PN, 5009 N.....20%
Competitor, 102 P, 102 PN, 202 P, 202 PN, 102 PR, 202 PR.....20%
304 P, 304 PN, 00304 P, 00304 PN.33⅓%

Registers—*List July 1, 1903.*

Japanned, Electroplated and Bronzed.....70%
White Porcelain Enamel....60%
Solid Brass or Bronze Metal, 40&10%

Revolvers—

Single Action.....95¢@$1.00
Double Action, except 44 cal.$1.85
Double Action, 44 caliber....$2.00
Automatic.....$3.25
Hammerless.....$3.75

Riddles, Hardware Grade

16 in.....*per doz.* $2.50@$2.75
17 in.....*per doz.* $2.75@$3.00
18 in.....*per doz.* $3.00@$3.25

Rings and Ringers—
Bull Rings—

	2	2½	3 inch.
Steel	$0.70	0.75	0.80 *doz.*
Copper	$1.00	1.15	1.40 *doz.*

Rea's Improved Self-Piercing, ℔ doz., Copper, 2 in., $1.25; 2½ in., $1.50; 3 in., $1.75.

Hog Rings and Ringers—

Hill's Rings, gro. boxes.$4.00@$4.50
Hill's Ringers, Gray Iron..... *doz.* 50@55¢
Hill's Ringers, Malleable Iron.. *doz.* 70@75¢
Blair's Rings...*per gro.*$4.75@5.25
Blair's Ringers.per doz. $0.60@ .65
Brown's Rings..*per gro.*$5.00@5.50
Brown's Ringers.per doz.$0.60@ .65

Rivets and Burrs—

Copper.....40&2½%
Iron or Steel.....75@75&5%

Bifurcated and Tubular—

Assorted in Boxes.
Bifurcated, per doz. boxes, pasteboard boxes, 23@25¢; Tin boxes, 29@32¢.
Tubular, per doz. boxes, 50 count, 29@32¢; 100 count, 51@58¢.

Rollers—

Acme, Stowell's Anti-Friction.....50%
Cronk's Stay No. 65, $0.90; No. 50.....$1.00
Cronk's Brinkerhoff No. 55, $0.60; No. 56.....$0.84
Lane's Stay.....40%
Richards' Stay:
Handy Adj. and Reversible No. 53.75¢
O. K. Adj. and Reversible No. 58.50¢
Lag Screw, Nos. 55 and 57.....50%
Underwriters', Nos. 59, 60.....50%
Favorite, No. 54.....60%
Stowell's Barn Door Stay..℔ doz. $1.00
Swett's Anti-Friction.....50%
Screw and Spike Stay.....℔ doz. 65¢
Hinge Adjustable Stay.....℔ doz. 90¢

Rope—

Manila, 7-16 in. diam. and larger:
Pure.....*lb.*, 12½@13¢
Sisal, 7-16 in. diam. and larger:
Pure.....*lb.*, 9¢
Sisal, 7-16 in. diam. and larger:
No. 2 quality.....*lb.*, 7¾@8¢
Sisal, Hay, Hide and Bale Ropes, Medium and Coarse:
Mixed.....*lb.*, 7¾@8¢
Pure.....*lb.*, 9¢
Sisal, Tarred, Medium Lath Yarn, Coarse and Untarred:
Mixed.....*lb.*, 7¾@8¢
Pure.....*lb.*, 9¢
Cotton Rope:
Best, ¼-in. and larger.16½@18¢
Medium, ¼-in. and larger, 15½@16½¢
Common, ¼-in. and larger..10¢
In coils, ½¢ advance.
Jute Rope:
Thread, No. 1, ¼-in. & up, lb., 8@8¼¢
Thread, No. 2, ¼-in. & up, lb... 7½@7¾¢
Old Colony Manila Transmission Rope.....℔ lb 17½¢

Wire Rope—

Galvanized.....37½&2½%
Plain.....45&2½%

Ropes, Hammock—

Covert Mfg. Co.:
Jute, 35%; Sisal..... 20%

Rules
Boxwood .....60@60&10%
Ivory .....35&10@35&10&5%
Chapin-Stephens Co.:
Boxwood 60%
Flexifold .....27½&10&10%
Ivory .....35@35&10&10%
Miscellaneous .....50@50&10&10%
Stephens' Combination.....55@55&10%
Stationers' .....10@10&10%
Keuffel & Esser Co.:
Folding, Wood.....35&10%
Folding, Steel.....33⅓&10%
Lufkin's Steel.....50&10%
Lufkin's Lumber.....60%
Stanley R. & L. Co.:
Boxwood 60%
Ivory 45%
Miscellaneous 40%
Zig Zag.....40%
Zig Zag, Pin Joint.....42½%
Upson Nut Co.:
Boxwood .....60@60&10%
Ivory .....35&10@35&10&10%

Sash Balances— See *Balance, Sash.*
Sash Locks— See *Locks, Sash.*
Sash Weights— See *Weights, Sash.*
Sausage Stuffers or Fillers See *Stuffers or Fillers, Sausage.*
Saw Frames— See *Frames, Saw.*
Saw Sets— See *Sets, Saw.*
Saw Tools— See *Tools, Saw.*

Saws—
Atkins':
Circular 50%
Band .....50&10@60%
Cross Cuts.....35&5%
Mulay, Mill and Drag.....50%
One-Man Saw, 40%; Wood Saws, 40%; Hand, Compass, &c., 40%.
Chapin-Stephens Co.:
Turning Saws and Frames..30@30&10%
Diamond Saw & Stamping Works:
Sterling Kitchen Saws.....30&10&10%
Disston's:
Circular, Solid and Ins'ted Tooth.50%
Band, 2 to 14 in. wide.....60%
Band, ¼ to 1¾.....60%
Crosscuts 45%
Narrow Crosscuts.....50%
Mulay, Mill and Drag.....50%
Framed Woodsaws.....25%
Woodsaw Blades.....25%
Woodsaw Rods.....25%
Hand Saws, Nos. 12, 99, 9, 16, d100, D8, 120, 76, 77, 8.....25%
Hand Saws, Nos. 7, 107, 107½, 3, 1, 0, 00, Combination.....30%
Compass, Key Hole, &c.....25%
Butcher Saws and Blades.....30%
C. E. Jennings & Co.'s:
Back Saws.....25%
Butcher Saws.....30%
Compass and Key Hole Saws..35&5%
Framed Wood Saws.....30%
Hand Saws.....20&2½%
Wood Saw Blades.....35%
Millers Falls:
Butcher Saws.....15&10%
Star Saw Blades.....15&10%
Massachusetts Saw Works:
Victor Kitchen Saws.....40&10&50%
Butcher Saws Blades.....35@40%
Peace & Richardson's Hand Saws...30%
Simonds':
Circular Saws.....50%
Crescent Ground Cross Cut Saws..35%
One-Man Cross Cuts.....40&10%
Gang Mill, Mulay and Drag Saws.50%
Band Saws.....50%
Back Saws.....25@25&7½%
Butcher Saws.....35@35&7½%
Hand Saws.....25@25&7½%
Hand Saws, Bay State Brand.....40%
Compass, Key Hole, &c..25@25&7½%
Wood Saws.....40&7½%
Wheeler, Madden & Clemson Mfg. Co.'s Cross Cut Saws.....50%

Hack Saw Blades and Frames—
Atkins' Hack Saw Blades A A A..25%
Disston's:
Concave Blades.....25%
Keystone Blades.....35%
Hack Saw Frames.....30%
Fitchburg File Works, The Best....35%
C. E. Jennings & Co.'s
Hack Saw Frames, Nos. 175, 180.... 40&7½%
Hack Saws, Nos. 175, 180, complete 40&7½%
Goodell's Hack Saw Blades.....40%
Griffin's Hack Saw Frames..35&5&10%
Griffin's Hack Saw Blades....35&5&10%
Star Hack Saws and Blades.....15&10%
Sterling Hack Saw Blades....30&10&5%
Sterling Hack Saw Frames..*30&10&10%
Sterling Power Hack Saw Machines, each, No. 1, $25.00; No. 2, $30.00..10%
Victor Hack Saw Blades.....25%
Victor Hack Saw Frames.....40%

Scroll—
Barnes, No. 1, $15.....25%
Barnes' Scroll Saw Blades.....40%
Barnes' Velocipede Power Scroll Saw, without boring attachment, $18; with boring attachment, $20.....20%
Lester, complete, $10.00.....15&10%
Rogers, complete, $3.50 and $4.00.. 15&10%

Scales—
Family, Turnbull's....50@50&10%
Counter:
Hatch, Platform, ½ oz. to 4 lbs. .....doz. $5.50
Two Platforms, ½ oz. to 8 lbs. .....doz. $16.00
Union Platform, Plain.$1.70@1.90
Union Platform, Stpd.$1.85@2.15
Chatillon's:
Eureka 25%
Favorite 40%
Crocers' Trip Scales.....50%
Chicago Scale Co.:
The Little Detective.....25 lbs 50%
Union or Family No. 2.....30%
Portable Platform (reduced list)..50%
Wagon or Stock (reduced list).25@35%
The Standard Portables.....45%
The Standard R. R. and Wagon .....50&10%

Scrapers—
Box, 1 Handle.....doz. $2.00@2.25
Box, 2 Handle.....doz.$3.50@2.60
Ship....Light, $2.00; Heavy, $4.50
Adjustable Box Scraper (S. R. & L. Co.), $6.00.....45%
Chapin-Stephens Co., Box 30@30&10&10%

Screws—Bench and Hand
Bench, Iron, doz., 1 in., $2.50@ 2.75; 1¼, $3.00@3.25; 1¼, $3.50@3.75
Bench Wood .....25@25&5%
Hand, Wood .....25@25&5%
R. Bliss Mfg. Co., Hand....30@30&10%
Chapin-Stephens Co., Hand.....25%

Coach, Lag and Hand Rail—
Lag, Cone Point, list Oct. 1, '99 .....75&15%
Coach, Gimlet Point, list Oct. 1, '99.....75&10%
Hand Rail, list Jan. 1, '81.... 70&10@75%

Jack Screws—
Standard List.....75%
Millers Falls.....50&10&10%
P., S. & W.....50%
Swett Iron Works.....75@80%

Machine—
List Jan. 1, '98:
Flat or Round Head, Iron.... 50@50&10%
Flat or Round Head, Brass.... 50@50&10%

Set and Cap—
Set (Iron).....75&10&7½%
Set (Steel), net advance over Iron 25%
Sq. Hd. Cap.....70&10&7½%
Hex. Hd. Cap.....70&10&7½%
Rd. Hd. Cap.....50&7½%
Fillister Hd. Cap.....60&7½%

Wood—
List July 23, 1903.
Flat Head, Iron.....87½&10@..%
Round Head, Iron...85 &10@..%
Flat Head, Brass.....82½&10%
Round Head, Brass..80 &10@..%
Flat Head, Bronze...77½&10@..%
Round Head, Bronze.75 &10@..%
Drive Screws.....87½&10%

Scroll Saws— See *Saws, Scroll.*

Scythes— *Per doz.*
Grass, No. 1, Plain....$6.25@6.75
Clipper, Bronzed Webb..$6.50@7.00
No. 3 Clipper, Pol'd Webb.. $6.75@7.25
No. 6 Clipper and Solid Steel.. $7.00@7.50
Bush, Weed and Bramble, No. 2 $6.50@7.00
Grain, No. 1.....$8.25@8.75
Bronzed Webb, No. 1..$8.50@9.00
Nos. 3 and 4 Clipper, Grain.. $8.75@9.25
Solid Steel, No. 6.....$9.25@9.75

Seeders, Raisin—
Enterprise .....25@30%

Sets— Awl and Tool—
Fray's Adj. Tool Handles, Nos. 1, $12; 2, $18; 3, $12; 4, $9; 5, $7.....50%
C. E. Jennings & Co.'s Model Tool Holders 30%
Millers Falls Adj. Tool Handles, No. 1, $12; No. 4, $12; No. 5, $18....15&10%

Garden Tool Sets—
Ft. Madison Three Plows, Hoe, Rake and Shovel.....℔ doz sets $9.00

Sets, Nail—
Octagon .....gro. $3.50@3.75
Buck Bros 27½%
Cannon's Diamond Point, ℔ gro.$12.40
Mayhew's .....℔ gro. $9.00
Snell's Cor'gated, Cup Pt...℔ gro. $7.20
Snell's Knurled, Cup Pt....℔ gro. $7.20
Victor Knurled Cup Pt....℔ gro. $7.50

Rivet—
Regular list.....75@75&10%

Saw—
Atkin's:
Criterion 40%
Adjustable 40%
Bemis & Call Co.'s:
Cross Cut.....30%
Plate 20%
Disston's Star, Monarch and Triumph 30%
Morrill's No. 1.....$15.00
Nos. 3 and 4, Cross Cut....$20.60
No. 5, Mill.....$30.00
Nos. 10, 11, 95.....$15.60
No. 1 Old Style.....$10.00
Special $16.25
Giant Royal Cross Cut.....℔ doz. $8.00
Royal, Hand.....℔ doz. $4.50
Taintor Positive.....℔ doz. $6.75

Shaving—
Fox Shaving Sets, No. 30.....
℔ doz., net, $24.00
Smith & Hemenway Co.'s.....60%

Sharpeners, Knife—
Chicago Wheel & Mfg. Co.....70%
Pike Mfg. Co.:
Fast Cut Pocket Knife Hones, ℔ doz.....$1.50
Mounted Kitchen Sand Stone, ℔ doz.....$1.50
Natural Grit Carving Knife Hones, ℔ doz.....$3.00
Quick Cut Emery Carving Knife Hones, ℔ doz.....$1.50
Quick Edge Pocket Knife Hones, ℔ doz.....$2.50

Skate—
Smith & Hemenway Co., Eureka..20%

Shaves, Spoke—
Iron .....doz.$1.10@1.25
Wood .....doz.$1.75@2.25
Bailey's (Stanley R. & L. Co.)....45%
Razor Edge (Stanley R. & L. Co.), Iron, 50%; Wood.....55%
Chapin-Stephens Co.....30@30&10&10%
Goodell's ℔ doz. $9.00.....15&10%
Wood's F1 and F2.....50%

Shears—

	7	8	9 in.	
Cast Iron..				
Best	*$16.00*	*18.00*	*20.00*	*gro.*
Good	*$13.00*	*15.00*	*17.00*	*gro.*
Cheap	*$5.00*	*6.00*	*7.00*	*gro.*

Straight Trimmers, &c.:
Best quality Jap....70@70&10%
Best quality, Nickel..60@60&10%
Fair quality, Jap....80@80&5%
Fair quality, Nickel..75@7"&10%
Tailors' Shears.....40@40&10%
Acme Cast Shears.....40@40&5%
Heinisch's Tailor's Shears.....10%
Wilkinson Shear & Cutlery Co.:
Sheep, 1900 list.....30&10&5%
Grass .....50&10%
Horse or Mule.....50&10%

Tinners' Snips—
Steel Blades.....20&5@20&10%
Steel Laid Blades.....40&10@50%
Forged Handles, Steel Blades, Berlin, 50%
Heinisch's Snips.....40%
Jennings & Griffin Mfg. Co.'s, 6½ to 10 in.....50%
Niagara Snips.....40%
P., S. & W. Forged Handles.....20%

Pruning Shears—
Cronk's Hand Shears.....33⅓%
Cronk's Wood Handle Shears.....33⅓%
Disston's Combined Pruning Hook and Saw, ℔ doz. $18.00.....25%
Disston's Pruning Hook only, ℔ doz., $12.00 .....25%
John T. Henry Mfg. Co.:
Pruning Shears, all grades.....50%
P., S. & W. Co.....30%
Wilkinson Shear & Cutlery Co.:
Hedge, Wilcut Brand.....60&10%
Lawn and Border, Wilcut Brand. 60&10%

Sheaves—Sliding Door—
Stowell's Anti-Friction.....50%
Reading 40%
R. & E. list.....15%
Wrightsville Hatfield Pattern.....80%

Sliding Shutter—
Reading list.....40%
R. & E. list.....10%

Shells—Shells, Empty—
Brass Shells, Empty:
Climax, Club, Rival, 10 and 12 gauge .....65&5%
Paper Shells, Empty:
Acme, Ideal, Leader, New Rapid, Magic, 10, 12, 16 and 20 gauge..25&5%
Blue Rival, New Climax, Challenge, Monarch, Defiance, Repeater, Yellow Rival, 10, 12, 14, 16 and 20 gauge .....20&5%
Climax, Union, League, New Rival, 10 and 12 gauge.....25&5%
Climax, Union, League, New Rival, 14, 16 and 20 gauge.....20&5%
Expert, Metal Lined and Pigeon, 10 12, 16 and 20 gauge.....33⅓&5%
Robin Hood, Low Brass.....20&5%
Robin Hood, High Brass.....30&5%
Indian, for Black Powder.....25&5%

Shells, Loaded—
Loaded with Black Powder..40%
Loaded with Smokeless Powder, medium grade.....40&5%
Loaded with Smokeless Powder, high grade.....40&10&10%
Robin Hood Smokeless Powder:
Robin Hood, Low Brass.....50%
Comets, High Brass.....50&10&5%
Indian, Black Powder.....40&5%

Shingles, Metal— Per. Sq.
Edwards Mfg. Co.:
Tin Galvanized.

	C. L.	L. C. L.
14 x 20	$4.25	$6.00
10 x 14	4.50	6.25
7 x 10	4.75	6.50

Wheeling Corrugating Co.:

	Painted,	Galv.
Dixie, 7 x 10 in.	$5.90	$7.00
Dixie, 10 x 14 in.	5.10	6.35
Dixie, 14 x 20 in.	4.75	5.65

Shoes, Horse, Mule, &c.—
F.o.b. Pittsburgh:
Iron .....per keg $4.00
Steel .....per keg $3.75
Burden's, all sizes.....℔ keg $3.90

Shot—
25-lb. bag.
Drop, up to B.....$1.90
Drop, B and larger.. ..... 2.15
Buck 2.15
Chilled 2.15
Dust 2.35

Shovels and Spades—
Association List, Nov. 15, 1902..40%

Snow Shovels—
Long Handle.....$2.75@$3.00
Wood and Mall, D. Handle. $3.25@$3.50

Sieves and Sifters—
Hunter's Imitation..... gro.$9.50@10.00
Hunter's Genuine..... per gro. $12.00@12.50
Buffalo Metallic Blued, R. M. Co., ℔ gr.

14&16	16&18	18&20
$13.20	$13.50	$14.40

Sieves, Seamless Metallic

—Per dozen.—				
Mesh	*14*	*16*	*18*	*20*
Iron Wire	*$1.05*	*1.05*	*1.10*	*1.20*
Tinned Wire	*$1.15*	*1.15*	*1.20*	*1.30*

Sieves, Wooden Rim—
Nested, 10, 11 and 12 Inch.
Mesh 18, Nested....doz. $0.90@0.95
Mesh 20, Nested....doz. $1.00@1.05
Mesh 24, Nested....doz. $1.30@1.40

Sinks, Cast Iron—
Painted, Standard list:
12 x 12 to 22 x 36 in.....60%
20 x 40 to 24 x 50 in.....50%
24 x 60 to 24 x 120 in.....30%
Barnes' low list:
Up to and including 20 x 36 in....60%
20 x 40 to 24 x 50 in.....55%
NOTE.—There is not entire uniformity in lists used by jobbers.

Skeins, Wagon—
Cast Iron.....70@75&10%
Steel .....40@45%

Slates, School—
Factory Shipments.
"D" Slates.....50@50&10%
Eureka, Unexcelled Noiseless.. 60&5 tens
Victor A, Noiseless..60&5 tens &5%

Slaw Cutters— See *Cutters.*

Snaps, Harness—
German .....40@40&10%
Covert Mfg. Co.:
Derby, 25%; Yankee, 30&2%; Yankee Roller, 30&2%
High Grade, 40%; Trojan.....40%
Jockey 25%
Oneida Community:
Harness Snaps, 1 inch.....60&5%
Swivel Snaps.....60%
Swivels 50%

Snaths—
Scythe 50%

Snips, Tinners— See *Shears.*

Spoons and Forks—
Silver Plated—
Good Quality.....50&10@60&5%
Cheap .....60@60&10%
International Silver Co.:
1847 Rogers Bros., 40&10%; Rogers & Hamilton.....50&10%
Rogers & Bro., William Rogers' Eagle Brand.....50&10%
Anchor, Rogers Brand.....60%
Wm. Rogers & Son.....60&10%

Miscellaneous—
German Silver.....60@60&5%
Cattaraugus Cutlery Co.:
Seneca Silver.....50%

Tinned Iron—
Teas .....per gro. 45@50¢
Tables.....per gro.$0.50@$1.00

Springs— Door—
Chicago (Coil).....40&10%
Gem (Coil).....20%
Pullman (Coil).....35%
Reliance (Coil).....40&10%
Star (Coil).....30%
Torrey's Rod, 30 in.....℔ doz. $1.10

Carriage, Wagon, &c.—

	Per lb.
1¼ in. and Wider:	
Black	*4@4¼¢*
Half Bright	*4@4¼¢*
Bright	*4½@4¾¢*
Painted Seat Springs:	
1¼ x 2 x 26.....per pr. 42¢	
1¼ x 3 x 28.....per pr. 70¢	

Sprinklers, Lawn—
Enterprise .....25@30%
Philadelphia No. 1, ℔ doz. $12; No. 2, $15; No. 3, $20.....30%
Pleuger & Henger Mfg. Co.:
Cactus, 65&5%; Japanese, 70&5%; Nationals, 60&5%.

Squares—
Nickel plated.. } *List Jan. 5, 1900.*
Steel and Iron. } 75@80%
Rosewood Hdl. Try Square and T-Bevels .....60&10&10@70%
Iron Hdl. Try Squares and T-Bevels .....40&10@40&10&10%
Disston's Try Squares and Bevels, Rosewood Handle, 67½%; Iron Stock and Bevel.....20%
Winterbottom's Try and Miter, No. 1, 35%; No. 2.....45%

Squeezers, Lemon
Wood, Common, gro., No. 0, $5.25@$5.50; No. 1, $6.25@$6.50.
Wood, Porcelain Lined:
Cheap .....doz. $1.00
Good Grade.....doz. $1.25
Tinned Iron.....doz. $0.75@1.25
Iron, Porcelain Lined...doz. $1.75

Staples—
Barbed Blind.....lb. 6@6¼¢
Electricians', Association list.. 80&10&10&10%
Fence Staples, Plain, $2.25; Galvanized $2.55
Poultry Netting Staples..... per lb. 3¼@3½¢

Steels, Butchers'—
Dick's 30%
Foster Bros.'.....30%
C. & A. Hoffmann's.....40%

Steelyards— ....50@30&10%

Stocks and Dies—
Blacksmiths' .....50@50&10%
Curtis Rev'ble Ratchet Die Stock..25%
Derby Screw Plates.....25%
Green River.....25%
Lightning Screw Plate.....25%
LittleGiant.....25%
Reece's New Screw Plates.....25%

Stoners, Cherry—
Enterprise .....25@30%

Stones—Oil, &c.
Chicago Wheel & Mfg. Co., 1904 list:
Gem Corundum Oil, Double Grit.60%
Gem Corundum Axe, Single or Double Grit.....60%
Gem Corundum Slips.....60%
Gem Corundum Razor Hones....50%
Pike Mfg. Co., 1904 list: ℔ lb.
Arkansas St. No. 1, 3 to 5½ in. .2.00
Arkansas St. No. 1, 5½ to 8 in.3.50
Arkansas Slips No. 1.....$4.00
Lily White Washita, 4 to 8 in.60¢
Rosy Red Washita, 4 to 8 in..60¢
Washita St., Extra, 4 to 8 in.50¢
Washita St., No. 1, 4 to 8 in.40¢
Washita St., No. 2, 4 to 8 in.30¢
Lily White Slips.....90¢
Rosy Red Slips.....90¢
Washita Slips, Extra.....80¢
Washita Slips, No. 1.....70¢
Washita Slips, No. 2.....40¢
India G.J. Stones (entire list)....33⅓%
Quickcut Emery and Corundum Oil Stone, Double Grit.....33⅓%
Quickcut Emery and Corundum Axe Stone, Double Grit.....33⅓%
Quickcut Emery Rubbing Bricks.33⅓%
Hindostan No. 1, R'g'lar.℔ lb. 8¢
Hindostan No. 1, Small..℔ lb 10¢
Axe Stones (all kinds).....
Turkey Oil Stones, Extra, 5 to 8 in.....℔ lb 80¢
Queer Creek Stones, 4 to 8 in.20¢
Queer Creek Slips.....40¢
Sand Stone.....6¢

Scythe Stones—

Chicago Wheel & Mfg. Co.:
Gem Corundum, 10 in., $8.00 ℔ gro., 12 in., $10.80.
Norton Emery Scythe Stones:
Less than gross lots.....℔ gro. $9.00
One gross or more.....℔ gro. $7.20
Lots of 10 gross or more..℔ gro. $6.00
Pike Mfg. Co., 1901 list:
Black Diamond S. S..℔ gro. $12.00
Lamoille S. S.....℔ gro. $11.00
White Mountain S. S.℔ gro. $9.00
Green Mountain S. S..℔ gro. $6.00
Extra Indian Pond S.S.℔ gro. $7.50
No. 1 Indian Pond S.S.℔ gro. $7.00
No. 2 Indian Pond S.S.℔ gro. $4.50
Leader Red End S. S.℔ gro. $4.50
Quick Cut Emery....℔ gro. $10.00
Pure Corundum,.....℔ gro. $18.00
Crescent.....$7.00
Emery Scythe Rifles, 2 Coat, $8
Emery Scythe Rifles, 3 Coat, $10
Emery Scythe Rifles, 4 Coat, $12
Balance of 1904 list 33⅓%

Stoppers, Bottle—

Victor Bottle Stoppers.....℔ gro, $9.00

Stops— Bench—

Millers Falls.....15&10%
Morrill's, ℔ doz., No. 1, $10.00.....50%
Morrill's, No. 2, $12.50.....50%

Door—

Chapin-Stephens Co.....60@60&10%

Plane—

Chapin-Stephens Co.....30%

Straps— Box—

Cary's Universal, case lots.....25&20%

Stretchers, Carpet—

Cast Iron, Steel Points, dos. 60@60&10%
Socket .....dos. $1.00
Bullard, ℔ doz.....$4.00
Excelsior Stretcher and Tack Hammer Combined, ℔ doz. $6.00.....20%

Strops, Razor—

Star Diagonal Strop.....25%

Stuffers, Sausage—

Enterprise Mfg. Co.....25@25&7½%
National Specialty Co., list Jan. 1, 1902.....30&5%

Sweepers, Carpet—

National Sweeper Co.: ℔ doz.
Louis XV, Roller Bearing, Gold Plated.....$120.00
Hepplewhite, Roller Bearing, Silver Plated.....$72.00
Sheraton, Roller Bearing, N'kel.$60.00
Ye Mission, Roller Bearing, Oxidized Coppered.....$36.00
Transparent, Roller Bearing, Plate Glass top, Nickeled.....$36.00
National Queen, Roller Bearing, Fancy Veneers.....$27.00
Loyal, Roller Bearing, Veneers, Nickeled.....$25.00
Triple Medal, Roller Bearing, Nickeled.....$24.00
Marion, Roller Bearing, N'kel.$24.00
Marion Queen, Roller Bearing, Nickeled.....$21.00
Monarch, Roller Bearing, N'kel.$22.00
Monarch, Roller Bearing, Jap..$20.00
Perpetual, Regular B'r'gs, N'kel.$20.00
Perpetual, Regular B'r'gs, Jap..$18.00
Monarch Extra (17 in. case), Roller Bearing, Nickeled.....$36.00
Monarch Extra (17 in. case), Roller Bearing, Japanned.....$33.00
Auditorium (26 in. case), Roller Bearing, Nickeled.....$54.00
Mammoth (30 in. case), Roller Bearing, Nickeled.....$60.00

NOTE.—Rebates: 50c per dozen on three-dozen lots; $1 per dozen on five-dozen lots; $2 per dozen on ten-dozen lots; $2.50 per dozen on twenty-five-dozen lots.

Streator Metal Stamping Co.:
Eureka Japanned.....℔ doz. $15.00
Model E, Sanitaire.....℔ doz $25.00
Model A, Sterling.....℔ doz. $25.00
Model B, Sterling, Nickeled.....℔ doz. $23.00
Model B, Sterling, Japanned.....℔ doz. $21.00
Model C, Sterling.....℔ doz. $21.50
Model D, Sterling.....℔ doz. $19.50

Tacks, Finishing Nails, &c.

New List, May 1, 1905.
American Carpet Tacks....
90&37½@—%
American Cut Tacks..90&37½@—%
Swedes Cut Tacks..90&37½@—%
Swedes Upholsterers'..90&55@—%
Gimp Tacks.....90&55@—%
Lace Tacks.....90&55@—%
Trimmers' Tacks....90&37½@—%
Looking Glass Tacks....65@—%
Bill Posters' and Railroad Tacks, 90&55@—%
Hungarian Nails.....80&20@—%
Finishing Nails.....70@—%
Trunk and Clout Nails..80@—%

NOTE.—The above prices are for Standard Weights. An extra 5% is given on Medium Weights, and an extra 10&5% is given on light weights.

Miscellaneous—

Double Pointed Tacks.....
90&5 or 6 tens
See also Nails, Wire.

Tanks, Oil—

	Each.
Emerald, R. M. Co.	30-gal. $3.40
Emerald, R. M. Co.	60-gal. $4.25
Queen City, R. M. Co.	30-gal. $3.65
Queen City, R. M. Co.	60-gal. $4.50

Tapes, Measuring—

American Asses' Skin ..50@—%
Patent Leather.....25@30&5%
Steel .....$3 1-3&5%
Chesterman's .....25@25&5%
Keuffel & Esser Co.:
Favorite, Ass Skin.....40&10@50%
Favorite, Duck and Leather.....25&5@25&10%
Metallic and Steel, lower list, 35@35&5%; Pocket, 35@35&5%.
Lufkin's:
Asses' Skin.....40&10@50%
Metallic .....30@30&5%
Patent Bend, Leather....25&5@25&10%
Pocket .....40@40&5%
Steel .....33⅓@35%
Wiebusch & Hilger:
Chesterman's Metallic, No. 34L, etc. 25%
Chesterman's Steel, No. 1038L, etc. 35%

Teeth, Harrow—

Steel Harrow Teeth, plain or headed, ⅝-inch and larger... per 100 lbs. $2.75@$3.00

Thermometers—

Tin Case.....80&10@80&10&5%

Ties, Bale—Steel Wire—

Single Loop.....80&2½%
Monitor, Cross Head, &c....70%

Brick Ties—

Niagara Brick Ties.....25&10%

Tinners' Shears, &c.—

See *Shears, Tinners', &c.*

Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.

Tire Benders, Upsetters, &c.

See *Benders and Upsetters, Tire.*

Tools—Coopers'—

L. & I. J. White.....20@20&5%

Hay—

Myers' Hay Tools.....50%
Stowell's Hay Carriers, 50%; Hay Forks, 50%; Fork Pulleys, 50%.

Miniature—

Smith & Hemenway Co.'s, Davidson 25%

Saw—

Atkins' Cross Cut Saw Tools.....40%
Simonds' Improved.....33⅓%
Simonds' Crescent.....25%

Ship—

L. & I. J. White.....25%

Transom Lifters—

See *Lifters, Transom.*

Traps—Fly—

Balloon, Globe or Acme, doz. $1.15@$1.25; gro.....$11.50@12.00
Harper, Champion or Paragon, doz. $1.25@1.40; gro. $13.00@13.50

Game—

Imitation Oneida.....75@75&5%
Newhouse .....45@45&5%
Hawley & Norton.....65%
Victor .....70&10%
Oneida Community Jump.....50%

Mouse and Rat—

Mouse, Wood, Choker, doz. holes 8½@9¢
Mouse, Round or Square Wire, doz. 85@90¢
Marty French Rat and Mouse Trap (Genuine):
No. 1, Rat, ℔ doz., $13.25; case of 24 .....$11.50 doz.
No. 3, Rat, ℔ doz., $6.50; case of 50 .....$5.75 doz.
No. 3½, Rat, ℔ doz. $5.25; case of 72 .....$4.70 doz.
No. 4, Mouse, ℔ doz. $3.85; case of 150 .....$3.00 doz.
No. 5, Mouse, ℔ doz. $3.00; case of 150 .....$2.25 doz.

Trimmers, Spoke—

Wood's E 1.....50%

Trowels—

Disston Brick and Pointing.....25%
Disston Plastering.....20%
Disston "Standard Brand" and Garden Trowels.....30%
Kohler's Steel Garden Trowels, ℔ gro., 5 in., $4.80; 6 in., $6.00.
Never-Break Steel Garden Trowels.. ℔ gro. $6.00
Rose Brick and Plastering.....25&5%
Wm. Rough & McParlin, Plastering.25%

Trucks, Warehouse, &c.—

B. & L. Block Co.:
New York Pattern.....50&10%
Western Pattern.....60&10%
Handy Trucks.....℔ doz. $16.00
Grocery .....℔ doz. $15.00
Daisy Stove Trucks, Improved Pattern .....℔ doz. $18.50
McKinney Trucks.....each $10.00
Model Stove Trucks.....℔ doz. $18.50

Tubs, Wash—*No. 1 2 3*

Galvanized, per doz..$4.25 4.75 5.25
Galvanized Wash Tubs (R. M. Co.):

No	1	2	3	10	20	30
Per doz., net.	$5.70	6.30	7.20	6.60	7.20	8.10

Twine, Miscellaneous—

Flax Twine:
No. 9, ¼ and ½-lb. Balls .22@24¢
No. 12, ¼ and ½-lb. Balls.19@21¢
No. 18, ¼ and ½-lb. Balls.17@19¢
No. 24, ¼ and ½-lb. Balls.16@18¢
No. 36, ¼ and ½-lb. Balls.15@17¢
Chalk Line, Cotton ½-lb. Balls .....25@30¢
Cotton Mops, 6, 9, 12 and 15 lb. to doz.....10@18¢
Cotton Wrapping, 5 Balls to lb., acording to quality...11½@20¢
American 2-Ply Hemp, ¼ and ½-lb. Balls.....13@14¢
American 3-Ply Hemp, 1-lb. Balls .....13@14¢
India 2-Ply Hemp, ¼ and ½-lb. Balls (Spring Twine)....9@10¢
India 3-Ply Hemp, 1-lb. Balls 9@10¢
India 3-Ply Hemp, 1½-lb. Balls. 8½@9½¢
2, 3, 4 and 5-Ply Jute, ½-lb. Balls .....10½@12¢
Mason Line, Linen, ½-lb. Bls. 46¢
No. 26½ Mattress, ¼ and ½-lb. Balls .....8¢
Wool, 3 to 6 ply...B 7½¢; A 8½¢

Vises—

Solid Box.....60%

Parallel—

Athol Machine Co.:
Simpson's Adjustable.....40%
Standard 40%
Amateur 25%
Columbian Hdw. Co.....40%
Emmert Universal:
Pattern Makers' No. 1, $15.00; No. 2, $12.50.
Machinist and Tool Makers' No. 4A, $12.50; No. 6A, $10.00; No. 10A, $22.50.
Presto Quick Acting Adjustable Jaw, 25@25&10%; Solid Jaw, 35@35&10%
Tiger Machinists'.....40%
Fisher & Norris Double Screw..15&10%
Hollands':
Machinists' .....40@45&5%
Keystone .....65&5@70%
Lewis Tool Co.:
Adjustable Jaw.....30%
Monarch, 50%; Solid Jaw.....50%
Massey Vise Co.:
Clincher 40%
Perfect, 15%; Lightning Grip.....15%
Merrill's 20%
Millers Falls Oval Slide Pattern.60&10%
Parker's:
Victor, 20@25%; Regulars.....20@25%
Vulcan's .....40@45%
Combination Pipe.....55@60%
Prentiss .....20@25%
Snediker's X. L.....33⅓%
Stephens' 33⅓%

Saw Filers—

Disston's D 3 Clamp and Guide, ℔ doz., $24.00, 30%; Clamps.....30%
Perfection Saw Clamps, ℔ doz....$4.50
Reading 60%
Wentworth's Rubber Jaw, Nos. 1, 2 and 3.....50%

Wood Workers—

Massey Vise Co.:
Lightning Grip, 15%; Perfect.....15%
Wyman & Gordon's Quick Action, 6 in., $6.00; 9 in., $7.00; 14 in., $8.00.

Miscellaneous—

Bignall & Keeler Combination Pipe Vise .....60&10%
Holland's Combination Pipe..60@60&5%
Massey's Quick Action Pipe.....40%
Parker's Combination Pipe:
87 Series, 60%; 187 Series, 60&5%; No. 870, 40%.

Wads—*Price per M.*

B. E., 11 up.....60¢
B. E., 9 and 10.....70¢
B. E., 8.....80¢
B. E., 7.....80¢
P. E., 11 up.....$1.00
P. E., 9 and 10..... 1.25
P. E., 8..... 1.50
P. E., 7..... 1.50
Ely's B. E., 11 and larger..$1.70@1.75
Ely's P. E., 12 to 20....$3.00@3.25

Dis. 15%

Ware, Hollow—

Cast Iron, Hollow—

Stove Hollow Ware:
Enameled 55%
Ground 60%
Plain or Unground.....65%
Country Hollow Ware, per 100 lbs. $2.75
White Enameled Ware:
Maslin Kettles.....70%
Covered Wares
Tinned and Turned.....40%
Enameled 50%
See also *Pots, Glue.*

Enameled—

Agate Nickel Steel Ware.....60%
Iron Clad Ware.....70&10%
Lava, Enameled.....40&10%
Never Break Enameled.....50%

Tea Kettles—

Galvanized Tea Kettles:

Inch.....	*6*	*7*	*8*	*9*
Each	*45¢*	*50¢*	*55¢*	*65¢*

Steel Hollow Ware—

Avery Spiders and Griddles..65@65&5%
Avery Kettles.....60%
Porcelained .....50&5@50&10%
Never Break Spiders and Griddles.. 65&5%
Never Break Kettles.....60%
Solid Steel Spiders and Griddles.65&5%
Solid Steel Kettles.....60%

Warmers, Foot—

Pike Mfg. Co., Soapstone....40@40&10%

Washboards—

Solid Zinc: ℔ doz.
Crescent, family size, bent frame.$3.70
Red Star, family size, stationary protector $3.70
Double Zinc Surface:
Saginaw Globe, family size, stationary protector.....$3.25
Cable Cross, family size, stationary protector.....$3.40
Single Zinc Surface:
Naiad, family size, open back, perforated $2.90
Single Saginaw Globe.....$2.75
Brass Surface:
Brass King, Single Surface, open back $3.65
Nickel Plate Surface:
No. 1001 Nickel Plate, Single Surface.....$2.65
Glass Surface:
Glass King, Single Surface, open back $3.65
Enamel Surface:
Enamel King, Single Surface, ventilated back.....$3.65

Washers—Leather, Axle—

Solid .....80&10@80&10&10%
Patent .....90@90&5%
Coil: ⅞ 1 1⅛ 1¼ Inch.
10¢ 11¢ 12¢ 13¢ per box

Iron or Steel—

Size bolt.... 5-16 ⅜ ½ ⅝ ¾
Washers ..$5.40 4.50 3.20 3.00 2.80
The above prices are based on $6.00 off list.
In lots less than one keg add ½¢ per lb.; 5-lb. boxes add ½¢ to list.

Cast Washers—

Over ½ inch, barrel lots..... per lb. 1¾@2¢

Weather Strip—

Flexible Felt—

Lined, per 100 ft., $2; $3; $4.....40&10%
Moore's Unlined, per 100 ft., $2; $3; $4 .....50&10%

Wedges—

Oil Finish.....lb. 2.70@2.80¢

Weights—Hitching—

Covert Mfg. Co.....30&2%

Sash—

Per ton, f.o.b. factory:
Eastern District..$27.50@$28.50
Southern Territory.$23.00@$24.00
Western and Central Districts .....$24.00@$27.00

Wheels, Well—

8-in., $1.55; 10-in., $2.00; 12-in., $2.50; 14-in., $4.00.

Wire and Wire Goods—

Bright and Annealed:
6 to 9.....80%
10 to 18.....80&2½%
19 to 26.....80&7½%
27 to 36.....80&2½%
Galvanized:
6 to 9.....75&5%
10 to 14.....75&7½%
15 to 16.....72½&10&2½%
19 to 26.....75%
27 to 36.....72½%
Coppered:
6 to 9.....75&5%
10 to 14.....75&7½%
15 to 18.....72½&10&2½%
19 to 26.....75&10&5%
27 to 36.....75%
Tinned:
6 to 14.....75&10&2½%
15 to 18.....75&7½%
Annealed, Steel and Tinned, on Spools .....70&10@75&10%
Brass and Copper on Spools... 60&10@65&10%
Brass .....Net list.
Cooper .....Net list.
Cast Steel Wire.....50%
Wire Clothes Line, see Lines.
Wire Picture Cord, see Cord.

Bright Wire Goods—

List June 24, '03.....90@90&10%
Brass Cup Hooks and Brass Screw Hooks.....85@—%

Wire Cloth and Netting—

Galvanized Wire Netting..... 80&5@80&10%
Painted Screen Cloth, 100 ft., $1.00@1.10
Standard Galv. Hardware Grade:
Nos. 2, 2½ & 3 Mesh, sq. ft. 3 ¢
Nos. 4 and 5 Mesh, sq. ft..3½¢
No. 6 Mesh, sq. ft.....3½¢
No. 8 Mesh, sq. ft.....4 ¢

Wire, Barb—See *Trade Report*

Wrenches—

Agricultural .....80@80&5%
Alligator or Crocodile..70&10@75%
Baxter Pattern S Wrenches... 70&5@70&10%
Drop Forged S.....45@45&5%
Acme .....60&10%
Alligator Pattern, 70%; Bull Dog..70%
Bemis & Call's:
Adjustable S, 40%; Adjustable S Pipe, 40%; Briggs Pattern, 40%; Combination Bright, 40%.
Bemis Pipe.....60%
Combination Black.....40&5%
Merrick Pattern.....50%
Boardman's 40%
Coes' Genuine Knife Hdl..40&10&5&5%
Coes' Genuine Steel Hdl..40&10&5&5%
Coes' Genuine Key Model..40&10&5&5%
Coes', Genuine Hammer Handle..... 40&10&5&5%
Coes' "Mechanics'"...40&10&5&5%
Donohue's Engineer.....40&10%
Eagle 70%
Elgin Wrenches, ℔ doz.....$6.25
Elgin Rethreading Attachment, only with one die, ℔ doz.....$6.25
Elgin Extra Dies, ℔ doz.....$3.00
Elgin Extra Jaws, ℔ doz.....$1.75
Elgin Monkey Wrench Pipe Jaws, ℔ doz.....$2.10
Gem Pocket.....50%
Hercules 70%
W. & B. Machinist:
Case lots.....50&5%
Less than case lots.....50%
W. & B. Railroad Special:
Case lots.....50%
Less than case lots.....40&10&5%
Solid Handles, P., S. & W.....50&5%
Stillson 65%
Vulcan Chain.....50%

Fruit Jar—

Triumph Fruit Jar Wrench, 5 gross lots, ℔ gross, $7.50; ℔ doz.....$0.80

Wringers—

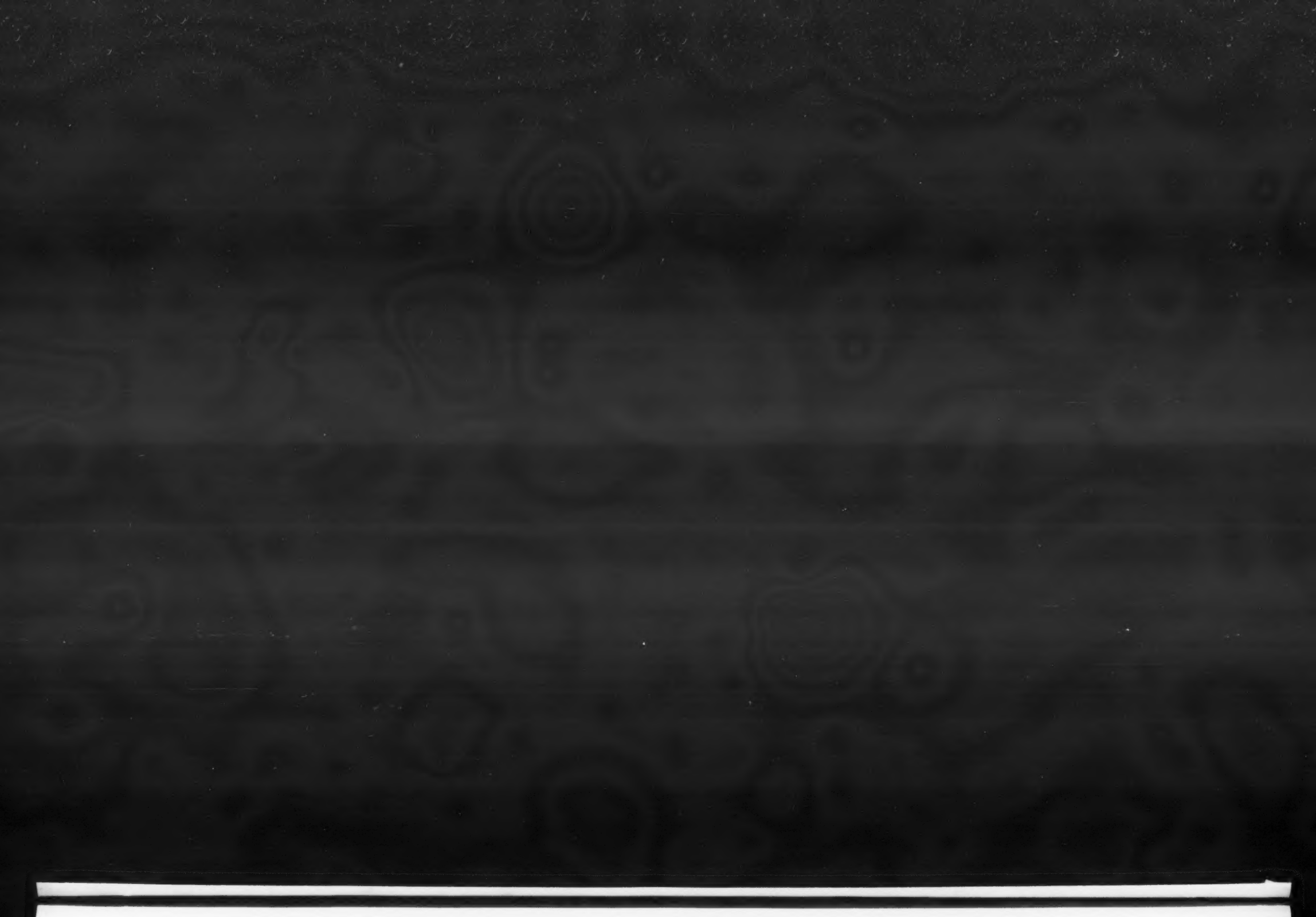
Tuttle Roller Press Mop Pail Wringer, each, $8.00; per doz.....$48.00

Wrought Goods—

Stables, Hooks, &c., list March 17, '92.....90@90&10%

Yokes, Ox, and Ox Bows—

Fort Madison's Farmers' & Freighters'.....list net

Zinc—

Sheet.....per 100 lbs., $8.15@8.40